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L80 ANSWER 1 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:625897 HCAPLUS Full-text

DN 141:126401

TI Method of preparation of solid **electrolyte** with high ionic conductivity for **battery** use

IN Park, Young-Sin; Jin, Young-Gu; Lee, Jong-Heun
 ; Lee, Seok-Soo

PA Samsung Electronics Co., Ltd., S. Korea

SO Eur. Pat. Appl., 15 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1443582	A1	<u>20040804</u>	EP 2004-250404	20040126 <--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	KR 2004069752	A	20040806	KR 2003-6288	20030130 <--
	US 2004151986	A1	20040805	US 2004-757500	20040115 <--
	JP 2004235155	A	20040819	JP 2004-24681	20040130 <--
PRAI	KR 2003-6288	A	20030130	<--	

AB A solid **electrolyte** is disclosed including a composition represented by formula: $a\text{Li}_2\text{O}-b\text{B}_2\text{O}_3-c\text{M}-d\text{X}$, wherein M is at least one selected from the group consisting of TiO_2 , V_2O_5 , WO_3 , and Ta_2O_5 ; X is at least one selected from LiCl and Li_2SO_4 ; $0.4 < a < 0.55$; $0.4 < b < 0.55$; $0.02 < c < 0.05$; $a+b+c = 1$, and $0 \leq d < 0.2$. A method for preparing the solid **electrolyte** and a **battery** using the solid **electrolyte** are also provided. The solid **electrolyte** exhibits high ionic conductivity. Lithium and thin film **batteries** using the solid **electrolyte** are improved in charge/discharge rate, power output, and cycle life.

IC ICM H01M0008-10

ICS H01M0006-18

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 57

ST **battery electrolyte** high ionic cond prepn method

IT **Secondary batteries**
 (lithium; method of preparation of solid **electrolyte** with high ionic conductivity for **battery** use)

IT **Battery electrolytes**
 Ionic conductivity
 (method of preparation of solid **electrolyte** with high ionic conductivity for **battery** use)

IT Glass, uses
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (method of preparation of solid **electrolyte** with high ionic conductivity for **battery** use)

IT 1303-86-2P, Boron oxide (B2O3), uses
 1314-35-8P, Tungsten oxide (WO3),
 uses 1314-61-0P, Tantalum oxide (Ta2O5) 1314-62-1P, Vanadium oxide (V2O5), uses 7447-41-8P, Lithium chloride (LiCl), uses 10377-48-7P, Lithium sulfate 12057-24-8P, Lithium oxide (Li2O), uses 13463-67-7P, Titania, uses
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (glass; method of preparation of solid **electrolyte** with high ionic conductivity for **battery** use)

IT 554-13-2, Lithium carbonate
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (precursor; method of preparation of solid **electrolyte** with high ionic conductivity for **battery** use)

IT 1303-86-2P, Boron oxide (B2O3), uses
 1314-35-8P, Tungsten oxide (WO3),
 uses 1314-61-0P, Tantalum oxide (Ta2O5) 1314-62-1P, Vanadium oxide (V2O5), uses 7447-41-8P, Lithium chloride (LiCl), uses 10377-48-7P, Lithium sulfate 12057-24-8P, Lithium oxide (Li2O), uses 13463-67-7P, Titania, uses
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (glass; method of preparation of solid **electrolyte** with high ionic conductivity for **battery** use)

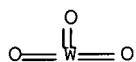
RN 1303-86-2 HCAPLUS

CN Boron oxide (B2O3) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 1314-35-8 HCAPLUS

CN Tungsten oxide (WO3) (CA INDEX NAME)



RN 1314-61-0 HCAPLUS

CN Tantalum oxide (Ta2O5) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 1314-62-1 HCAPLUS

CN Vanadium oxide (V2O5) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

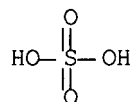
RN 7447-41-8 HCAPLUS

CN Lithium chloride (LiCl) (CA INDEX NAME)

Cl—Li

RN 10377-48-7 HCAPLUS

CN Sulfuric acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

RN 12057-24-8 HCAPLUS

CN Lithium oxide (Li2O) (CA INDEX NAME)

Li—O—Li

RN 13463-67-7 HCAPLUS

CN Titanium oxide (TiO2) (CA INDEX NAME)

O=Ti=O

L80 ANSWER 2 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:100613 HCAPLUS Full-text

DN 140:131168

TI Apparatus and method for fracture absorption layer for use in fabrication of thin-film electrochemical devices

IN Benson, Martin H.; Neudecker, Bernd J.

PA ITN Energym Systems, Inc., USA

SO U.S. Pat. Appl. Publ., 25 pp.

CODEN: USXXCO

DT **Patent**

LA English

FAN.CNT 1

PATENT NO.

KIND

DATE

APPLICATION NO.

DATE

PI US 2004023106 A1 20040205 US 2002-210180 20020802 <--
 US 6770176 B2 20040803
 US 2004219434 A1 20041104 US 2004-840497 20040506 <--
 PRAI US 2002-210180 A3 20020802 <--

AB An apparatus for use as a fracture absorption layer, an apparatus for use as an electrochem. device, and methods of manufacturing the same are disclosed. The apparatus and methods of the present invention may be of particular use in the manufacture of thin-film, lightwt., flexible or conformable, electrochem. devices such as **batteries**, and arrays of such devices. The present invention may provide many advantages including stunting fractures in a first electrochem. layer from propagating in a second electrochem. layer.

IC ICM H01M0006-00

INCL 429122000; 429126000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 72

ST **battery** fabrication fracture absorption layer app; electrochem
 device fabrication fracture absorption layer app

IT **Electrolytes**

Primary batteries

(thin-film; apparatus and method for fracture absorption layer for use in fabrication of thin-film electrochem. devices)

IT 554-13-2, Lithium carbonate 1303-28-2, Arsenic oxide (As2O5)
 1303-86-2, **Boron oxide (B2O3)**, uses
 1304-56-9, Beryllium oxide beo, uses 1306-38-3, Ceria, uses 1310-53-8,
 Germanium oxide (GeO2), uses 1314-23-4, Zirconia, uses 1314-36-9,
 Yttria, uses 1314-56-3, Phosphorus pentoxide, uses 1327-53-3, Arsenic
 oxide (As2O3) 1344-28-1, Alumina, uses 7429-90-5, Aluminum,
 uses 7439-93-2, Lithium, uses 7440-20-2, Scandium, uses 7440-21-3,
 Silicon, uses 7440-31-5, Tin, uses 7440-38-2, Arsenic, uses
 7440-41-7, Beryllium, uses 7440-42-8, Boron, uses 7440-45-1, Cerium,
 uses 7440-56-4, Germanium, uses 7440-65-5, Yttrium, uses 7440-67-7,
 Zirconium, uses **7447-41-8, Lithium chloride**,
 uses 7550-35-8, Lithium bromide 7631-86-9, Silica, uses 7704-34-9,
 Sulfur, uses 7723-14-0, Phosphorus, uses 7723-14-0D, Phosphorus,
 compound 7789-24-4, Lithium fluoride, uses 7791-03-9, Lithium
 perchlorate 9002-84-0, Ptfе 9003-39-8, Polyvinylpyrrolidone
 10043-11-5, Boron nitride (BN), uses **10377-48-7, Lithium**
sulfate 10377-51-2, Lithium iodide 10377-52-3, Lithium
 phosphate 11118-04-0, Lithium phosphorus nitride Li7PN4 11126-15-1,
 Lithium vanadium oxide 12003-67-7, Aluminum
 lithium oxide allio2 12005-14-0, Aluminum
 lithium oxide al5lio8 12025-11-5, Germanium
 lithium oxide geli4o4 12033-89-5, Silicon nitride,
 uses **12057-24-8, Lithia**, uses 12060-08-1, Scandium oxide
 (Sc2O3) 12065-36-0, Germanium nitride ge3n4 12136-91-3, Phosphorus
 nitride p3n5 12169-03-8, Lithium yttrium oxide liyo2 12209-15-3,
 Lithium scandium oxide lisco2 12232-41-6, Beryllium lithium
 oxide Be2Li2O3 12355-58-7, Aluminum lithium
 oxide alli5o4 12384-10-0, Lithium zirconium oxide li8zro6
 12408-97-8, Boron lithium nitride BLi3N2 12521-45-8, Lithium silicon
 nitride LiSi2N3 12521-55-0, Lithium silicon nitride Li2SiN2
 12521-66-3, Lithium silicon nitride Li8SiN4 13453-69-5, Lithium borate
 libo2 13453-84-4, Lithium silicon oxide li4sio4 13478-14-3, Lithium
 arsenate 14024-11-4, Aluminum lithium chloride
 AlLiCl4 14283-07-9, Lithium tetrafluoroborate 15138-76-8, Lithium
 tetrafluoroaluminate 17739-47-8, Phosphorus nitride pn 19497-94-0,
 Aluminum lithium silicate allisio4 21324-40-3, Lithium
 hexafluorophosphate 24304-00-5, Aluminum nitride Aln 25322-68-3,
 Polyethylene oxide 25658-42-8, Zirconium nitride (ZrN) 25764-13-0,
 Yttrium nitride (YN) 26134-62-3, Lithium nitride li3n 30622-39-0,

Lithium titanium phosphate $\text{LiTi}_2(\text{PO}_4)_3$ 39300-70-4, Lithium nickel oxide 39449-52-0, Lithium oxide silicate $(\text{Li}_2\text{O}_2(\text{SiO}_4))$ 39457-42-6, Lithium manganese oxide 56320-64-0 57349-02-7, Cerium lithium oxide CeLiO_2 60883-88-7, Lithium phosphorus nitride LiPN_2 61027-73-4, Aluminum lithium nitride AlLi_3N_2 62795-18-0 66581-07-5 66581-08-6 67181-65-1, Lithium silicon nitride Li_5SiN_3 76068-31-0 87796-15-4, Lithium scandium phosphate $\text{Li}_3\text{Sc}_2(\text{PO}_4)_3$ 101993-97-9, Lithium phosphate silicate $\text{Li}_{3.6}(\text{PO}_4)_0.4(\text{SiO}_4)_0.6$ 111706-40-2, Cobalt lithium oxide CoLiO -102 113957-82-7, Lithium silicon nitride $\text{Li}_{21}\text{Si}_3\text{N}_{11}$ 113957-83-8, Lithium silicon nitride $\text{Li}_{18}\text{Si}_3\text{N}_{10}$ 143080-25-5, Phosphorus nitride oxide $\text{p}_4\text{n}_6\text{o}$ 170171-06-9, Aluminum lithium fluoride AlLiF_4 184905-46-2, Lithium nitrogen phosphorus oxide 651045-58-8, Lithium nitrogen phosphorus tin oxide

RL: DEV (Device component use); USES (Uses)

(apparatus and method for fracture absorption layer for use in fabrication of thin-film electrochem. devices)

IT 7446-07-3, Tellurium oxide 7446-08-4, Selenium oxide SeO_2 7782-49-2, Selenium, processes 12031-80-0, **Lithium oxide** Li_2O_2 12142-83-5, Tin nitride Sn_3N_4 12188-25-9, Lithium tin oxide Li_2SnO_3 12286-33-8, Tin phosphide Sn_4P_3 12344-15-9, Lithium tin oxide Li_8SnO_6 12372-55-3 12640-89-0, Selenium oxide 13451-18-8, Tellurium oxide TeO_3 13494-80-9, Tellurium, processes 13762-75-9, Lithium metaphosphate 13843-41-9, Lithium pyrophosphate 15578-26-4, Tin phosphate $\text{Sn}_2\text{P}_2\text{O}_7$ 15578-32-2, Tin phosphate $\text{Sn}_3(\text{PO}_4)_2$ 18282-10-5, Tin dioxide 23369-45-1, Phosphorus nitride oxide PNO 25324-56-5, Tin phosphide SnP 37221-29-7, Sulfur nitride 37367-13-8, Tin phosphide SnP_3 50645-72-2, Lithium tin phosphide Li_5SnP_3 50645-73-3, Lithium tin phosphide Li_8SnP_4 53680-59-4 102055-50-5, Lithium silicon nitride 116301-91-8, Phosphorous acid, trilithium salt 161286-52-8, Lithium sulfide thiosilicate $(\text{Li}_{1.2}\text{SO}_{0.2}(\text{SiS}_3)_0.4)$ 651045-60-2, Lithium phosphide $(\text{LiO}-3\text{P})$ 651045-62-4, Lithium nitride phosphide $(\text{Li}_{10}\text{N}_{10}\text{P})$ 651045-64-6, Lithium metaphosphate nitrate oxide $(\text{Li}_{2.88}(\text{PO}_3)(\text{NO}_3)_0.14\text{O}_{0.31})$

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(sputter target; apparatus and method for fracture absorption layer for use in fabrication of thin-film electrochem. devices)

IT 1303-86-2, **Boron oxide** (B_2O_3) , uses 7429-90-5, Aluminum, uses 7447-41-8, **Lithium chloride**, uses 10377-48-7, **Lithium sulfate** 12057-24-8, Lithia, uses

RL: DEV (Device component use); USES (Uses)

(apparatus and method for fracture absorption layer for use in fabrication of thin-film electrochem. devices)

RN 1303-86-2 HCAPLUS

CN Boron oxide (B_2O_3) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

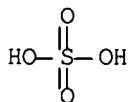
RN 7447-41-8 HCAPLUS

CN Lithium chloride (LiCl) (CA INDEX NAME)

Cl-Li

RN 10377-48-7 HCAPLUS

CN Sulfuric acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

RN 12057-24-8 HCAPLUS
 CN Lithium oxide (Li2O) (CA INDEX NAME)

Li-O-Li

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	1991			GB 2236540 A	HCAPLUS
Anon	1996			KR 9612317 B1	HCAPLUS
Anon	1997			WO 9721538	HCAPLUS
Anon	1998			WO 9847196	HCAPLUS
Anon	1999			WO 9943034	HCAPLUS
Anon	2000			WO 0008234	HCAPLUS
Bates	1994			US 5314765 A	HCAPLUS
Bates	1994			US 5338625 A	HCAPLUS
Bates	1996			US 5512147 A	HCAPLUS
Bates	1996			US 5567210 A	HCAPLUS
Bates	2001			US 6218049 B1	HCAPLUS
Brennan	1990			US 4980202 A	HCAPLUS
Cable	1995			US 5445903 A	HCAPLUS
Chen	1989			US 4837230 A	HCAPLUS
Fauteaux	2002			US 20020071992 A1	
Hobson	1995			US 5445906 A	HCAPLUS
Huang	1999			US 5948196 A	HCAPLUS
Keem	1993			US 5268216 A	
Kennedy	1997			US 5682594 A	HCAPLUS
Narasimhan	2001			US 20010016273 A1	
Neudecker	2001			US 6168884 B1	HCAPLUS
Steffier	1995			US 5455106 A	HCAPLUS
Steffier	1996			US 5480707 A	HCAPLUS
Steffier	1996			US 5545435 A	HCAPLUS
Steffier	1996			US 5558907 A	HCAPLUS
Van Den Berg	2001			US 6224968 B1	HCAPLUS

L80 ANSWER 3 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:78581 HCAPLUS Full-text

DN 140:131130

TI Composite electrodes and encapsulated electrode particles for use in solid electrochemical devices

IN Holman, Richard K.; Chiang, Yet-ming; Gozdz, Antoni S.; Loxley, Andrew; Nunes, Benjamin; Ostraat, Michele; Riley, Gilbert N.; Viola, Michael S.

PA A123 Systems, Inc., USA

SO U.S. Pat. Appl. Publ., 28 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004018430	A1	20040129	US 2003-354405	20030130 <--
	US 7087348	B2	20060808		
	WO 2004011901	A2	20040205	WO 2003-US22954	20030722 <--
	WO 2004011901	A3	20040624		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	AU 2003281736	A1	20040216	AU 2003-281736	20030722 <--
PRAI	US 2002-398697P	P	20020726	<--	
	US 2003-354405	A	20030130	<--	
	WO 2003-US22954	W	20030722		

AB The present invention relates generally to electrodes for use in electrochem. devices, and more particularly, to coated electrode particles for use in solid **electrochem. cells**, and to materials and systems for improving electronic conductivity and repulsive force characteristics of an electrode network. The present invention also relates to an article comprising a plurality of electroactive particles that form an electrode network wherein the electroactive particles are coated with a system of elec. conductive and low refractive index materials.

IC ICM H01M0004-64

ICS H01M0004-62

INCL 429233000; 429217000; 429232000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 56, 72

ST electrochem device composite electrode; encapsulated electrode particle
electrochem device; **battery** encapsulated electrode particle

IT **Battery** electrodes

Conducting polymers

Electric conductivity

Electrodes

Ionic conductivity

Polymer electrolytes

Sol-gel processing

(composite electrodes and encapsulated electrode particles for use in solid electrochem. devices)

IT **Secondary batteries**

(lithium; composite electrodes and encapsulated electrode particles for use in solid electrochem. devices)

IT 7429-90-5, Aluminum, uses

RL: MOA (Modifier or additive use); USES (Uses)

(LiMnO₂ doped with; composite electrodes and encapsulated electrode particles for use in solid electrochem. devices)

IT 79-10-7D, Acrylic acid, fluorinated ester 96-49-1, Ethylene carbonate
105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 616-38-6,
Dimethyl carbonate 1307-96-6, Cobalt oxide coo, uses 1313-13-9,
Manganese oxide mno₂, uses 1313-99-1, Nickel oxide nio, uses
1314-62-1, Vanadium oxide, uses 1317-34-6,

Manganese oxide mn_2o_3 1317-35-7, Manganese oxide mn_3o_4 1344-43-0,
 Manganese oxide mno , uses 1345-25-1, Iron oxide feo , uses 7439-93-2,
 Lithium, uses 7439-93-2D, Lithium, intercalation compound 7440-21-3,
 Silicon, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses
 7440-36-0, Antimony, uses 7440-42-8, Boron, uses 7440-56-4, Germanium,
 uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7782-42-5,
 Graphite, uses 9002-84-0, Ptfе 9003-07-0, Polypropylene 9003-53-6,
 Polystyrene 11099-11-9, **Vanadium oxide** 11126-15-1,
 Lithium vanadium oxide 12002-78-7 12031-65-1,
 Lithium nickel oxide linio_2 12037-30-8, **Vanadium oxide**
 v_6o_{11} 12037-42-2D, **Vanadium oxide** V_6O_{13} ,
 lithium-intercalated 12048-27-0, Bili 12057-17-9, Lithium manganese
 oxide limn_2o_4 12057-22-6, Lizi 12057-30-6, Antimony, compound with
 lithium (1:3) 12057-33-9 12063-07-9, Iron lithium
 oxide fe_2lio_4 12162-79-7, Lithium manganese oxide limno_2
 12190-79-3, Cobalt lithium oxide colio_2 12253-44-0
 12338-02-2 **13463-67-7, Titanium oxide**, uses
 13826-59-0, Lithium manganese phosphate limnp_4 15365-14-7, Iron lithium
 phosphate felipo_4 18282-10-5, Tin dioxide 18358-13-9D, Methacrylate,
 fluorinated ester 21651-19-4, Tin monoxide 24937-79-9, Pvdф
 25014-41-9, Polyacrylonitrile 25322-68-3, Peo 37217-08-6, Lithium
 titanium oxide titi_2o_4 49717-87-5D, 2-Propenoic acid,
 ion(1-) homopolymer, fluoroalkyl derivative 49717-97-7D, 2-Propenoic acid,
 2-methyl-, ion(1-), homopolymer, fluoroalkyl derivative 50926-11-9, Ito
 52627-24-4, Cobalt lithium oxide 53262-48-9
 55608-41-8 56627-44-2 61812-08-6, Lithium silicide Li_2Si
 66403-10-9, Lithium boride (Li_5B_4) 67070-82-0 71012-86-7, Lithium
 boride (Li_7B_6) 74083-26-4 76036-33-4, Lithium silicide Li_2Si
 114778-10-8, Iron lithium sulfate $\text{fe}_2\text{li}_2(\text{so}_4)_3$
 496816-56-9, Lithium, compound with silver (10:3)
 RL: DEV (Device component use); USES (Uses)

(composite electrodes and encapsulated electrode particles for use in
 solid electrochem. devices)

IT **1303-86-2, Boron oxide (B_2O_3)**, uses
 1304-76-3, Bismuth oxide, uses 1314-23-4, Zirconium oxide, uses
 1314-56-3, Phosphorus oxide (P_2O_5), uses 1317-36-8, Lead oxide (PbO),
 uses 1335-25-7, Lead oxide 1343-98-2, Silicon hydroxide 1344-28-1,
 Aluminum oxide, uses **7447-41-8, Lithium**
chloride, uses 7631-86-9, Silicon oxide, uses 7789-24-4,
 Lithium fluoride, uses 10043-35-3, Boric acid (H_3BO_3), uses
 10361-43-0, Bismuth hydroxide 10377-51-2, Lithium iodide 11098-99-0,
 Molybdenum oxide **12057-24-8**, Lithia, uses 12651-23-9, Titanium
 hydroxide 14475-63-9, Zirconium hydroxide 21645-51-2, Aluminum
 hydroxide, uses 39345-91-0, Lead hydroxide 126853-99-4, Molybdenum
 hydroxide 157858-56-5, Germanium oxide 350010-45-6, Germanium
 hydroxide

RL: DEV (Device component use); USES (Uses)

(glass; composite electrodes and encapsulated electrode particles for
 use in solid electrochem. devices)

IT 7429-90-5, Aluminum, uses
 RL: MOA (Modifier or additive use); USES (Uses)
 (LiMnO₂ doped with; composite electrodes and encapsulated electrode
 particles for use in solid electrochem. devices)

IT **1314-62-1, Vanadium oxide**, uses
13463-67-7, Titanium oxide, uses
 RL: DEV (Device component use); USES (Uses)
 (composite electrodes and encapsulated electrode particles for use in
 solid electrochem. devices)

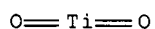
RN 1314-62-1 HCAPLUS

CN Vanadium oxide (V_2O_5) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 13463-67-7 HCAPLUS

CN Titanium oxide (TiO₂) (CA INDEX NAME)



IT 1303-86-2, Boron oxide (B₂O₃), uses

7447-41-8, Lithium chloride, uses

12057-24-8, Lithia, uses

RL: DEV (Device component use); USES (Uses)

(glass; composite electrodes and encapsulated electrode particles for use in solid electrochem. devices)

RN 1303-86-2 HCAPLUS

CN Boron oxide (B₂O₃) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

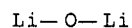
RN 7447-41-8 HCAPLUS

CN Lithium chloride (LiCl) (CA INDEX NAME)



RN 12057-24-8 HCAPLUS

CN Lithium oxide (Li₂O) (CA INDEX NAME)



RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Akashi	2003			US 20030008212 A1	
Akuto	1989			US 4889777 A	HCAPLUS
Aleshin	1998	94	173	Synthetic Metals	HCAPLUS
Amatucci	1998			US 5705291 A	HCAPLUS
Anon	1983			EP 0071119	HCAPLUS
Anon	1992			JP 04-58455	HCAPLUS
Anon	1995			JP 07101728	HCAPLUS
Anon	1997			JP 09022693	HCAPLUS
Anon	1997			JP 09147862	HCAPLUS
Anon	1998			WO 9812761	HCAPLUS
Anon	1998			WO 9816960	HCAPLUS
Anon	1999			WO 9933129	HCAPLUS
Anon	1999			WO 9956331	HCAPLUS
Anon	2000			WO 0041256	HCAPLUS
Anon	2000			CA 2270771	HCAPLUS
Anon	2001			WO 0177501	
Anon	2002			WO 0243168	HCAPLUS
Anon	2002			EP 1231651	HCAPLUS
Anon	2002			EP 1231653	HCAPLUS
Anon	2003			WO 03012908	HCAPLUS

Anon	2003			WO 03056646	HCAPLUS
Armand	1988			US 4758483 A	HCAPLUS
Armand	1979		31	Electrodes and Elect	
Atkinson	1986			US 4599114 A	HCAPLUS
Barker	2000			US 6063519 A	HCAPLUS
Barker	2001			US 6291097 B1	HCAPLUS
Barker	2003			US 6528033 B1	HCAPLUS
Bates	2004			US 6818356 B1	HCAPLUS
Biagetti	1973			US 3765943 A	HCAPLUS
Bouridah	1985	15	233	Solid State Ionics	HCAPLUS
Broadhead	1975			US 3864167 A	HCAPLUS
Broadhead	1995			Handbook of Batterie	
Burroughs	1998			US 5789100 A	
Cao	1997			US 5624605 A	HCAPLUS
Chaloner-Gill	2002			US 20020192137 A1	
Chaloner Gill	1995			US 5399447 A	HCAPLUS
Chaloner Gill	1996			US 5520850 A	HCAPLUS
Chasser	2000			US 6069221 A	HCAPLUS
Chen	1997			US 5677080 A	
Chiang	2001			US 6231779 B1	HCAPLUS
Chiang	2002			US 20020036282 A1	
Chiang	2003			US 20030082446 A1	
Chiang	2003			US 20030099884 A1	HCAPLUS
Chiang	2003			US 6599662 B1	HCAPLUS
Chiang	2004			US 20040005265 A1	
Chiang	1999	2	107	Electrochem. Sol. St	HCAPLUS
Cho	2003			US 20030049529 A1	
Cho	2005			US 6878487 B1	HCAPLUS
Chu	2002			US 6413284 B1	HCAPLUS
Chu	2002			US 6413285 B1	HCAPLUS
Cromack	1998			US 5821033 A	HCAPLUS
Et Al Van Oss	1977	6	341	Imunnunol. Com	
Et Al Van Oss	1979	14	305	Separation Sci. Tec	
Fauteux	1996			US 5578396 A	
Fauteux	1996			US 5588971 A	
Fauteux	1997			US 5591544 A	
Forrest	2004			US 20040151887 A1	
French	1995	75	13	Solid State Ionics	HCAPLUS
Fukuyama	2002			US 20020015278 A1	
Gao	1998			US 5834136 A	HCAPLUS
Ghosh	1998	10	1097	Adv. Mater	HCAPLUS
Goebel	1993			US 5227267 A	
Goodenough	1999			US 5910382 A	HCAPLUS
Gozdz	1996			US 5554459 A	HCAPLUS
Gozdz	1996			US 5587253 A	HCAPLUS
Gozdz	1998			US 5840087 A	HCAPLUS
Gozdz	2005			US 20050034993 A1	
Gray, F	1991			Solid Polymer Electr	
Grunwald	2000			US 6096453 A	HCAPLUS
Hart	2003		120	Electrochemistry Com	
Hasebe	1997			US 5654115 A	HCAPLUS
Hayashida	1992			US 5100747 A	HCAPLUS
Hirahara	2001			US 6322924 B1	HCAPLUS
Hirai	1993			US 5187209 A	HCAPLUS
Hirai	1993			US 5213895 A	
Hiroi	2001			US 6306540 B1	HCAPLUS
Holman	2004			US 20040018430 A1	HCAPLUS
Howard	1998			US 5714053 A	HCAPLUS
Huang	1995			US 5436093 A	HCAPLUS
Idota	1997	276	1395	Science	HCAPLUS

Jan	2001			US 6300016 B1	HCAPLUS
Kang	2002			US 6395429 B1	HCAPLUS
Klein	1997			US 5698342 A	HCAPLUS
Koga	1996			US 5589297 A	HCAPLUS
Koshiishi	1996			US 5527641 A	
Kuwabata	1999	44	4593	Electrochimica Acta	HCAPLUS
Kwak	2001			US 6280875 B1	HCAPLUS
Kweon	2002			US 20020071990 A1	
Kweon	2002			US 20020071991 A1	
Kweon	2003			US 20030003352 A1	
Kweon	2003			US 20030054250 A1	HCAPLUS
Kweon	2004			US 20040018429 A1	
Kweon	2004			US 6753111 B1	HCAPLUS
Kweon	2004			US 6797435 B1	HCAPLUS
Lake	2000			US RE36843 E	
Lecras	1996	89	203	Solid State Ionics	HCAPLUS
Limthongkul	2001	13	2397	Chem. Mater	HCAPLUS
Long	2004			US 20040265692 A1	HCAPLUS
Matsufuji	1998			US 5759714 A	HCAPLUS
Matsumoto	2004			US 6800399 B1	HCAPLUS
Matsumoto	1992	139		J. Electrochem. Soc.	HCAPLUS
Mayes	2002			US 20020048706 A1	
Milling	1996	180	460	Journal of Colloid a	HCAPLUS
Minnet	1988	28-30	1192	Solid State Ionics	
Miura	2000			US 6159389 A	
Moulton	1995			US 5441830 A	HCAPLUS
Moulton	1995			US 5464707 A	HCAPLUS
Nagaoka			659	High Ionic Conductiv	
Narang	2002			US 20020074972 A1	
Narang	2002			US 6337156 B1	HCAPLUS
Neumannnn	1979	257	413	Colloid and Polymer	
Nitzan	1999			US 5897522 A	HCAPLUS
Ohzuku	1995	143	4033	J. Electrochem. Soc.	
Otagawa	1994			US 5294504 A	HCAPLUS
Patel	2002			US 6342317 B1	
Poehler	2000			US 6120940 A	HCAPLUS
R. French	2000	83	2117	Journal of the Ameri	
Rampel	1981			US 4245016 A	HCAPLUS
Ravet	2002			US 20020195591 A1	
Repplinger	1996			US 5518833 A	HCAPLUS
Riley	2005			US 20050026037 A1	
Roach	2002			US 6403263 B1	HCAPLUS
Schutts	2000			US 6136476 A	HCAPLUS
Searson	1998			US 5733683 A	HCAPLUS
Shackle	2001			US 6174623 B1	HCAPLUS
Shacklette	1987			US 4668596 A	HCAPLUS
Shuster	1985			US 4555454 A	HCAPLUS
Stachoviak	2000			US 6117593 A	
Stewart	1986			US 4615784 A	HCAPLUS
Stramel	1996			US 5567754 A	HCAPLUS
Taniuchi	1999			US 5925283 A	HCAPLUS
Touhsaent	1998			US 5827615 A	HCAPLUS
Tran	2000			US 6096454 A	HCAPLUS
Turi	1995			US 5478676 A	HCAPLUS
Van Oss	1980	1	45	Colloids and Surface	HCAPLUS
Van Oss	1979	8	11	Imunnunol. Comm.	HCAPLUS
Vleggaar	1999			US 5902689 A	HCAPLUS
Wang	2004			US 20040185343 A1	
Wang	2002	149	A967	Journal of Electroch	HCAPLUS
Whitacre	2004			US 6764525 B1	HCAPLUS

Yamada	2002		US 6410189 B1	HCAPLUS
Yoon	2002		US 6495283 B1	HCAPLUS
Yoshioka	2001		US 20010005558 A1	
Yoshioka	2001		US 20010005562 A1	
Yoshioka	2001		US 20010007726 A1	
Zallen		183	The Physics of Amorp	

L80 ANSWER 4 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:413937 HCAPLUS Full-text

DN 138:404345

TI **Battery** structures, self-organizing structures and related methods

IN Chiang, Yet Ming; Moorehead, William Douglas; Gozdz, Antoni S.; Holman, Richard K.; Loxley, Andrew; Riley, Gilbert N.; Viola, Michael S.

PA Al23systems, Inc., USA

SO U.S. Pat. Appl. Publ., 70 pp., Cont.-in-part of U.S. Ser. No. 21,740.
CODEN: USXXCO

DT **Patent**

LA English

FAN.CNT 5

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	---	-----	-----	-----
PI	US 2003099884	A1	20030529	US 2002-206662	20020726 <--
	US 2003082446	A1	20030501	US 2001-21740	20011022 <--
	US 2004018431	A1	20040129	US 2003-354673	20030130 <--
	US 2005272214	A1	20051208	US 2005-108602	20050418 <--
PRAI	US 2001-308360P	P	20010727	<--	
	US 2001-21740	A2	20011022	<--	
	US 2000-242124P	P	20001020	<--	
	US 2002-206662	A2	20020726	<--	
	US 2004-563026P	P	20040416		
	US 2004-583850P	P	20040629		

AB An energy storage device includes a first electrode comprising a first material and a second electrode comprising a second material, at least a portion of the first and second materials forming an interpenetrating network when dispersed in an **electrolyte**, the **electrolyte**, the first material and the second material are selected so that the first and second materials exert a repelling force on each other when combined. An electrochem. device, includes a first electrode in elec. communication with a first current collector; a second electrode in elec. communication with a second current collector; and an ionically conductive medium in ionic contact with the first and second electrodes, wherein at least a portion of the first and second electrodes form an interpenetrating network and wherein at least one of the first and second electrodes comprises an electrode structure providing two or more pathways to its current collector.

IC ICM **H01M0004-64**

ICS **H01M0004-80; H01M0004-58**

INCL 429233000; 429235000; 429231950; 429212000; 429231400; 429210000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery** self organizing structure

IT **Battery** anodes

Battery cathodes

Coating process

Embossing

(**battery** structures, self-organizing structures and related methods)

IT Fluoropolymers, uses

Glass, uses

Polyamines

Polyimides, uses

Polyoxyalkylenes, uses

RL: DEV (Device component use); USES (Uses)

(**battery** structures, self-organizing structures and related methods)

IT Polymers, uses

RL: DEV (Device component use); USES (Uses)

(block, Li salt-doped; **battery** structures, self-organizing structures and related methods)

IT **Primary batteries**

(lithium; **battery** structures, self-organizing structures and related methods)

IT Intercalation compounds

RL: DEV (Device component use); USES (Uses)

(lithium; **battery** structures, self-organizing structures and related methods)

IT Azines

Group VA element compounds

RL: DEV (Device component use); USES (Uses)

(phosphazines; **battery** structures, self-organizing structures and related methods)

IT 7439-95-4, Magnesium, uses

RL: MOA (Modifier or additive use); USES (Uses)

(CoLiO₂ doped with; **battery** structures, self-organizing structures and related methods)

IT 7440-03-1, Niobium, uses 7440-25-7, Tantalum, uses 7440-32-6,

Titanium, uses 7440-33-7, Tungsten, uses 12042-37-4, AlLi

RL: MOA (Modifier or additive use); USES (Uses)

(LiFePO₄ doped with; **battery** structures, self-organizing structures and related methods)

IT 7429-90-5, Aluminum, uses

RL: MOA (Modifier or additive use); USES (Uses)

(LiMnO₂ doped with; **battery** structures, self-organizing structures and related methods)

IT 68-12-2, Dmf, uses 75-11-6, Diiodomethane 96-49-1, Ethylene carbonate 105-58-8, DiEthyl carbonate 108-32-7, Propylene carbonate 616-38-6, DimEthyl carbonate 627-31-6, 1,3-Diiodopropane 1307-96-6, Cobalt monoxide, uses 1313-13-9, Manganese dioxide, uses 1313-99-1, Nickel oxide (NiO), uses **1314-62-1**, Vanadia, uses 1317-34-6, Manganese oxide mn₂o₃ 1317-35-7, Manganese oxide mn₃o₄ 1335-25-7, Lead oxide 1343-98-2, Silicon hydroxide 1344-43-0, Manganese oxide mno, uses 1345-25-1, Iron oxide feo, uses 7226-23-5 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compound 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-42-8, Boron, uses 7440-44-0, Carbon, uses 7440-56-4, Germanium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7631-86-9, Silicon oxide, uses 7782-42-5, Graphite, uses 9003-53-6, Polystyrene 10043-35-3, Boric acid (H₃BO₃), uses 10361-43-0, Bismuth hydroxide 12002-78-7 12031-65-1, Lithium nickel oxide linio₂ 12037-30-8, **Vanadium oxide v6o11** 12048-27-0, Bili 12057-17-9, Lithium manganese oxide limn₂o₄ 12057-22-6, LiZn 12057-30-6 12057-33-9 12063-07-9, Iron lithium oxide fe₂lio₄ 12162-79-7, Lithium manganese oxide limno₂ 12190-79-3, Cobalt lithium oxide colio₂ 12253-44-0 12338-02-2 12651-23-9, Titanium hydroxide **13463-67-7**, **Titanium oxide**, uses 14475-63-9, Zirconium hydroxide Zr(OH)₄ 15365-14-7, Iron lithium phosphate felipo₄ 18282-10-5, Tin dioxide 12651-19-4, Tin oxide sno 24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile 25322-68-3, Peo 25322-69-4, Polypropylene oxide 37217-08-6, Lithium titanium oxide liti₂o₄ 39345-91-0, Lead hydroxide 53262-48-9

55575-96-7, Lithium silicide Li13Si4 55608-41-8 56627-44-2
 61812-08-6, Lithium silicide Li21Si8 66403-10-9, Lithium boride Li5B4
 67070-82-0 71012-86-7, Lithium boride Li7B6 74083-26-4 76036-33-4,
 Lithium silicide Li12Si7 106494-93-3, Lithium silicide Li21Si5
 114778-10-8, Iron lithium sulfate Fe2Li2(SO4)3
 144419-56-7, Cobalt lithium magnesium oxide Co0.95LiMg0.05O2 496816-56-9
 496816-58-1, Iron lithium zirconium phosphate Fe0.98LiZr0.02(PO4)
 531493-25-1, Iron lithium titanium phosphate (Fe0.98LiTi0.02(PO4))

RL: DEV (Device component use); USES (Uses)

(**battery** structures, self-organizing structures and related methods)

IT 99742-70-8, Poly(o-methoxyaniline) 104934-51-2, Poly(3-octylthiophene)

RL: MOA (Modifier or additive use); USES (Uses)

(**battery** structures, self-organizing structures and related methods)

IT 1303-86-2, Boron oxide (B2O3), uses

1304-76-3, Bismuth oxide (Bi2O3), uses 1314-23-4, Zirconium oxide, uses

1314-56-3, Phosphorus oxide (P2O5), uses 1317-36-8, Lead oxide (PbO),

uses 7447-41-8, Lithium chloride, uses

7789-24-4, Lithium fluoride, uses 10377-51-2, Lithium iodide

12057-24-8, Lithia, uses

RL: DEV (Device component use); USES (Uses)

(glass; **battery** structures, self-organizing structures and related methods)

IT 7429-90-5, Aluminum, uses

RL: MOA (Modifier or additive use); USES (Uses)

(LiMnO2 doped with; **battery** structures, self-organizing structures and related methods)

IT 1314-62-1, Vanadia, uses 13463-67-7, Titanium

oxide, uses

RL: DEV (Device component use); USES (Uses)

(**battery** structures, self-organizing structures and related methods)

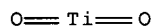
RN 1314-62-1 HCAPLUS

CN Vanadium oxide (V2O5) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 13463-67-7 HCAPLUS

CN Titanium oxide (TiO2) (CA INDEX NAME)



IT 1303-86-2, Boron oxide (B2O3), uses

7447-41-8, Lithium chloride, uses

12057-24-8, Lithia, uses

RL: DEV (Device component use); USES (Uses)

(glass; **battery** structures, self-organizing structures and related methods)

RN 1303-86-2 HCAPLUS

CN Boron oxide (B2O3) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 7447-41-8 HCAPLUS

CN Lithium chloride (LiCl) (CA INDEX NAME)

Cl-Li

RN 12057-24-8 HCAPLUS
 CN Lithium oxide (Li2O) (CA INDEX NAME)

Li-O-Li

L80 ANSWER 5 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:118181 HCAPLUS Full-text

DN 138:156304

TI **Battery** structures, self-organizing structures, and related methods

IN Chiang, Yet-Ming; Moorehead, William Douglas; Holman, Richard K.; Viola, Michael S.; Gozdz, Antoni S.; Loxley, Andrew; Riley, Gilbert N., Jr.

PA Massachusetts Institute of Technology, USA; A123 Systems

SO PCT Int. Appl., 138 pp.

CODEN: PIXXD2

DT **Patent**

LA English

FAN.CNT 5

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003012908	A2	20030213	WO 2002-US23880	20020726 <--
	WO 2003012908	A8	20040219		
	WO 2003012908	A9	20040325		
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	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,				
	CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,				
	GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,				
	LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH,				
	PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ,				
	UA, UG, UZ, VN, YU, ZA, ZW				
	RW:				
	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,				
	KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES,				
	FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF,				
	CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
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	CA 2455819	A1	20030213	CA 2002-2455819	20020726 <--
	AU 2002330924	A1	20030217	AU 2002-330924	20020726 <--
	EP 1433217	A2	20040630	EP 2002-768358	20020726 <--
	R:				
	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,				
	IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK				
	JP 2005525674	T	20050825	JP 2003-517975	20020726 <--
	CN 1864298	A	20061115	CN 2002-818181	20020726 <--
	IN 2004KN00118	A	20060407	IN 2004-KN118	20040130 <--
PRAI	US 2001-308360P	P	20010727	<--	
	US 2001-21740	A	20011022	<--	
	US 2000-242124P	P	20001020	<--	
	WO 2002-US23880	W	20020726	<--	

AB An energy storage device includes a first electrode comprising a first material and a second electrode comprising a second material, at least a portion of the first and second materials forming an interpenetrating network when dispersed in an **electrolyte**, the **electrolyte**, the first material and the second material are selected so that the first and second materials exert a repelling force on each other when combined. An electrochem. device, includes

a first electrode in elec. communication with a first current collector; a second electrode in elec. communication with a second current collector; and an ionically conductive medium in ionic contact with the first and second electrodes, wherein at least a portion of the first and second electrodes form an interpenetrating network and wherein at least one of the first and second electrodes comprises an electrode structure providing two or more pathways to its current collector.

- IC ICM H01M0010-04
- ICS H01M0010-40; H01M0004-04; H01M0004-02;
H01B0009-00; G02F0001-00
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72
- ST **battery** structure self organizing structure
- IT Phosphazenes
RL: DEV (Device component use); USES (Uses)
(methoxyethoxy)ethoxy; **battery** structures, self-organizing
structures, and related methods)
- IT **Battery** anodes
Battery cathodes
Conducting polymers
Embossing
Encapsulants
Ink-jet printing
Lithography
Polymer electrolytes
Primary batteries
Screen printing
(**battery** structures, self-organizing structures, and related
methods)
- IT Fluoropolymers, uses
Polyamines
Polyimides, uses
Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(**battery** structures, self-organizing structures, and related
methods)
- IT Polyesters, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**battery** structures, self-organizing structures, and related
methods)
- IT Polyesters, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**battery** structures, self-organizing structures, and related
methods)
- IT Glass, uses
RL: DEV (Device component use); USES (Uses)
(bismuth lithium borate; **battery** structures, self-organizing
structures, and related methods)
- IT Polymers, uses
RL: DEV (Device component use); USES (Uses)
(block, lithium salt-doped, **electrolyte**; **battery**
structures, self-organizing structures, and related methods)
- IT Electric apparatus
(electrochem.; **battery** structures, self-organizing
structures, and related methods)
- IT Polyoxyalkylenes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(lithium complexes, perchlorate- or triflate-containing; **battery**
structures, self-organizing structures, and related methods)
- IT **Secondary batteries**

(lithium; **battery** structures, self-organizing structures, and related methods)

IT Composites
(nanocomposite; **battery** structures, self-organizing structures, and related methods)

IT Printing (nonimpact)
(stenciling; **battery** structures, self-organizing structures, and related methods)

IT Molding
(tape-casting; **battery** structures, self-organizing structures, and related methods)

IT Coating process
(web; **battery** structures, self-organizing structures, and related methods)

IT 7439-95-4, Magnesium, uses
RL: MOA (Modifier or additive use); USES (Uses)
(CoLiO2 doped with; **battery** structures, self-organizing structures, and related methods)

IT 7440-03-1, Niobium, uses 7440-25-7, Tantalum, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses
RL: MOA (Modifier or additive use); USES (Uses)
(FeLiPO4 doped with; **battery** structures, self-organizing structures, and related methods)

IT 7429-90-5, Aluminum, uses
RL: MOA (Modifier or additive use); USES (Uses)
(LiMnO2 doped with; **battery** structures, self-organizing structures, and related methods)

IT 68-12-2, n,n-Dimethylformamide, uses 75-11-6, Diiodomethane 96-49-1, Ethylene carbonate 105-58-8, DiEthyl carbonate 108-32-7, Propylene carbonate 616-38-6, DimEthyl carbonate 627-31-6, 1,3-Diiodopropane 1307-96-6, Cobalt oxide coo, uses 1313-13-9, Manganese oxide mno2, uses 1313-99-1, Nickel oxide nio, uses 1314-23-4, Zirconium oxide, uses 1314-62-1, Vanadia, uses 1317-34-6, Manganese oxide mn2o3 1317-35-7, Manganese oxide mn3o4 1335-25-7, Lead oxide 1344-43-0, Manganese oxidemno, uses 1345-25-1, Iron oxide feo, uses 7226-23-5 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compound 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-42-8, Boron, uses 7440-44-0, Carbon, uses 7440-56-4, Germanium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7782-42-5, Graphite, uses 9002-84-0, Ptfе 9003-53-6, Polystyrene 10361-43-0, Bismuth hydroxide 12002-78-7 12031-65-1, Lithium nickel oxide linio2 12037-30-8, **Vanadium oxide** v6o11 12042-37-4, Alli 12048-27-0, Bili 12057-17-9, Lithium manganese oxide limn2o4 12057-22-6, Lizn 12057-30-6 12057-33-9 12063-07-9, Iron lithium oxide fe2lio4 12162-79-7, Lithium manganese oxide limno2 12190-79-3, Cobalt lithium oxide colio2 12253-44-0 12338-02-2 12651-23-9, Titanium hydroxide 13463-67-7, **Titanium oxide**, uses 14475-63-9, Zirconium hydroxide 15365-14-7, Iron lithium phosphate felipo4 18282-10-5, Tin dioxide 21324-40-3, Lithium hexafluorophosphate 21651-19-4, Tin oxide sno 24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile 25322-68-3, Peo 25322-69-4, Polypropylene oxide 37217-08-6, Lithium titanium oxide liti2o4 39345-91-0, Lead hydroxide 50851-57-5 53262-48-9 53640-36-1 55575-96-7, Lithium silicide Li13Si4 55608-41-8 56627-44-2 61812-08-6, Lithium silicide Li21Si8 66403-10-9, Lithium boride (Li5B4) 67070-82-0 71012-86-7, Lithium boride (Li7B6) 74083-26-4 76036-33-4, Lithium silicide Li12Si7 98973-15-0, MEEP 106494-93-3, Lithium silicide Li21Si5 126213-51-2, Poly(3,4-ethylenedioxythiophene) 144419-56-7, Cobalt lithium magnesium

oxide $\text{Co}_{0.95}\text{LiMg}_{0.05}\text{O}_2$ 496816-56-9 496816-57-0, Cobalt lithium
magnesium oxide ($\text{Co}_{0.95}\text{Li}_{0.95}\text{Mg}_{0.05}\text{O}_{1.9}$) 496816-58-1, Iron lithium
zirconium phosphate ($\text{Fe}_{0.98}\text{LiZr}_{0.02}(\text{PO}_4)$)

RL: DEV (Device component use); USES (Uses)

(**battery** structures, self-organizing structures, and related
methods)

IT 76-05-1, Trifluoroacetic acid, uses 104-15-4, Toluene sulfonic acid,
uses 7647-01-0, Hydrochloric acid, uses 57534-41-5, Zonyl FSN

RL: MOA (Modifier or additive use); USES (Uses)

(**battery** structures, self-organizing structures, and related
methods)

IT 9002-88-4, Polyethylene 11099-11-9, **Vanadium oxide**
25038-59-9, Mylar, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(**battery** structures, self-organizing structures, and related
methods)

IT 99742-70-8, Poly(o-methoxyaniline) 104934-51-2, Poly(3-octylthiophene)

RL: TEM (Technical or engineered material use); USES (Uses)

(coating; **battery** structures, self-organizing structures, and
related methods)

IT 7440-50-8, Copper, uses

RL: DEV (Device component use); USES (Uses)

(current collector; **battery** structures, self-organizing
structures, and related methods)

IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate

RL: MOA (Modifier or additive use); USES (Uses)

(**electrolyte**, cog. polyethylene oxide; **battery**
structures, self-organizing structures, and related methods)

IT 1303-86-2, **Boron oxide** B_2O_3 , uses

1304-76-3, Bismuth oxide Bi_2O_3 , uses 1314-56-3, Phosphorus pentoxide,
uses 1317-36-8, Lead oxide PbO , uses **7447-41-8**,

Lithium chloride, uses 7631-86-9, Silica, uses

7789-24-4, Lithium fluoride, uses 10377-51-2, Lithium iodide

12057-24-8, Lithia, uses

RL: DEV (Device component use); USES (Uses)

(glass; **battery** structures, self-organizing structures, and
related methods)

IT 7439-93-2D, Lithium, polyethylene oxide complexes 25322-68-3D, Peo,
lithium complexes

RL: MOA (Modifier or additive use); USES (Uses)

(perchlorate- or triflate-containing; **battery** structures,
self-organizing structures, and related methods)

IT 7429-90-5, Aluminum, uses

RL: MOA (Modifier or additive use); USES (Uses)

(LiMnO_2 doped with; **battery** structures, self-organizing
structures, and related methods)

IT **1314-62-1**, Vanadia, uses **13463-67-7**, **Titanium**
oxide, uses

RL: DEV (Device component use); USES (Uses)

(**battery** structures, self-organizing structures, and related
methods)

RN 1314-62-1 HCAPLUS

CN Vanadium oxide (V_2O_5) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 13463-67-7 HCAPLUS

CN Titanium oxide (TiO_2) (CA INDEX NAME)

O==Ti==O

IT 1303-86-2, Boron oxide b2o3, uses
 7447-41-8, Lithium chloride, uses
 12057-24-8, Lithia, uses
 RL: DEV (Device component use); USES (Uses)
 (glass; **battery** structures, self-organizing structures, and
 related methods)
 RN 1303-86-2 HCAPLUS
 CN Boron oxide (B2O3) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
 RN 7447-41-8 HCAPLUS
 CN Lithium chloride (LiCl) (CA INDEX NAME)

Cl-Li

RN 12057-24-8 HCAPLUS
 CN Lithium oxide (Li2O) (CA INDEX NAME)

Li-O-Li

L80 ANSWER 6 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 2000:790239 HCAPLUS Full-text
 DN 133:323990
 TI High temperature lithium oxyhalide **electrochemical cell**
 IN Spillman, David M.; Takeuchi, Esther S.
 PA Wilson Greatbatch Limited, USA
 SO Eur. Pat. Appl., 9 pp.
 CODEN: EPXXDW
 DT **Patent**
 LA English
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1050913	A1	20001108	EP 2000-303777	20000505 <--
	EP 1050913	B1	20070124		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, CY				
	US 6569562	B1	20030527	US 2000-564401	20000501 <--
	JP 2001102015	A	20010413	JP 2000-172769	20000502 <--
	US 6410181	B1	20020625	US 2000-562532	20000502 <--
	AT 352876	T	20070215	AT 2000-303777	20000505 <--
	EP 1050912	B1	20070418	EP 2000-303789	20000505 <--
	R: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE				
	JP 2001118584	A	20010427	JP 2000-176121	20000508 <--
PRAI	US 1999-132549P	P	19990505	<--	
	US 2000-562532	A	20000502	<--	
	US 2000-564401	A	20000501	<--	

AB An alkali metal **electrochem. cell** (particularly a lithium oxyhalide cell) comprises an alkali metal anode, a cathode, a catholyte, and a separator comprising E-glass material disposed between the anode and the cathode. The catholyte comprises an organic solvent or inorg. depolarizer solvent and preferably a casing houses the anode and the cathode. The oxyhalide cell exhibits superior restart characteristics by the provision of a MANNIGLASS 1200 separator.

IC ICM **H01M0002-16**

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium oxyhalide **battery**

IT Glass, uses
 RL: DEV (Device component use); USES (Uses)
 (E-glass; high temperature lithium oxyhalide **electrochem. cell**)

IT Primary **battery** separators
 (MANNIGLASS 1200; high temperature lithium oxyhalide **electrochem. cell**)

IT Halides
 Halides
 Halogen compounds
 Halogen compounds
 RL: DEV (Device component use); USES (Uses)
 (halogen halides; high temperature lithium oxyhalide **electrochem. cell**)

IT Carbonaceous materials (technological products)
 Halogens
 RL: DEV (Device component use); USES (Uses)
 (high temperature lithium oxyhalide **electrochem. cell**)

IT **Primary batteries**
 (lithium; high temperature lithium oxyhalide **electrochem. cell**)

IT 7440-02-0, Nickel, uses
 RL: DEV (Device component use); USES (Uses)
 (current collector; high temperature lithium oxyhalide **electrochem. cell**)

IT **1303-86-2, Boron oxide (B2O3), uses**
 1305-78-8, Calcium oxide cao, uses 1309-48-4, Magnesia, uses
 1313-59-3, Sodium oxide (Na2O), uses 1344-28-1, Alumina, uses
 1345-25-1, Iron oxide feo, uses 7631-86-9, Silica, uses 12136-45-7, Potassium oxide (K2O), uses **13463-67-7, Titania, uses**
 RL: DEV (Device component use); USES (Uses)
 (glass; high temperature lithium oxyhalide **electrochem. cell**)

IT 67-68-5, DmsO, uses 68-12-2, uses 75-05-8, Acetonitrile, uses
 108-32-7, Propylene carbonate 109-99-9, uses 127-19-5, Dimethyl acetamide 556-65-0, Lithium thiocyanate 865-44-1, Iodine trichloride 2923-17-3 2923-20-8 3982-91-0, Phosphorus sulfide trichloride **7447-41-8, Lithium chloride, uses 7550-35-8,**
 Lithium bromide 7553-56-2, Iodine, uses 7719-09-7, Thionyl chloride 7726-95-6, Bromine, uses 7782-41-4, Fluorine, uses 7782-50-5, Chlorine, uses 7783-66-6, Iodine pentafluoride 7787-71-5, Bromine trifluoride 7789-30-2, Bromine pentafluoride 7789-33-5, Iodine monobromide 7790-89-8, Chlorine monofluoride 7790-91-2, Chlorine trifluoride 7790-99-0, Iodine monochloride 7791-03-9, Lithium perchlorate 7791-23-3, Selenium oxychloride 7791-25-5, Sulfuryl chloride **12057-24-8, Lithium oxide, uses**
 13453-75-3, Lithium fluorosulfate 13863-41-7, Bromine monochloride 13863-59-7, Bromine monofluoride 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate 14485-20-2, Lithium tetraphenyl borate 14977-61-8, Chromyl chloride 15955-98-3,

Lithium tetrachlorogallate 18424-17-4, Lithium hexafluoroantimonate
 21324-40-3, Lithium hexafluorophosphate 22520-96-3, Iodine trifluoride
 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate
 90076-65-6 115028-88-1 132404-42-3 134631-70-2 302904-70-7

RL: DEV (Device component use); USES (Uses)

(high temperature lithium oxyhalide **electrochem. cell**)

IT 1303-86-2, **Boron oxide (B2O3)**, uses

13463-67-7, **Titania**, uses

RL: DEV (Device component use); USES (Uses)

(glass; high temperature lithium oxyhalide **electrochem. cell**)

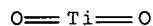
RN 1303-86-2 HCAPLUS

CN Boron oxide (B2O3) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 13463-67-7 HCAPLUS

CN Titanium oxide (TiO2) (CA INDEX NAME)



IT 7447-41-8, **Lithium chloride**, uses

12057-24-8, **Lithium oxide**, uses

RL: DEV (Device component use); USES (Uses)

(high temperature lithium oxyhalide **electrochem. cell**)

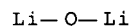
RN 7447-41-8 HCAPLUS

CN Lithium chloride (LiCl) (CA INDEX NAME)



RN 12057-24-8 HCAPLUS

CN Lithium oxide (Li2O) (CA INDEX NAME)



RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Ensci Inc	1987			EP 0239343 A	HCAPLUS
Greatbatch W Ltd	1981			GB 2056752 A	HCAPLUS
Hobson, D	1998			US 5705293 A	HCAPLUS
Mitsubishi Paper Mills	1998			EP 0834936 A	HCAPLUS
Saft America Inc	1986			EP 0191569 A	HCAPLUS

L80 ANSWER 7 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1997:92540 HCAPLUS Full-text

DN 126:201593

TI Novel materials for solid state **batteries**

AU Akhter, S. K.; Hashmi, R. A.; Rahman, R.

CS Department of Physics, University of Karachi, Karachi, 75270, Pak.

SO Advanced Materials--95, Proceedings of the International Symposium on

Advanced Materials, 4th, Islamabad, Pak., Sept. 17-21, 1995 (1996
) , Meeting Date 1995, 139-148. Editor(s): ul Haq, Anwar. Publisher: Dr.
A.Q. Khan Research Laboratories, Kahuta, Rawalpindi, Pak.
CODEN: 63TEAY

DT Conference

LA English

AB The phys. properties of fast ion conducting glasses used as **electrolytes** for solid-state **batteries** are discussed. Glass transition temperature increased with the addition of another glass former in the binary system of lithium borate glasses. The d. and refractive index measurements indicate the composition effect in the system of lithium ion conducting glasses. Complex impedance spectroscopy measurements for elec. characterization are reported. In lithium borovanadate glasses the ionic conductivity reached a maximum value of $5.86 \times 10^{-5} \Omega\text{-cm}$ at 400 K. The value of activation energy is obtained as 0.54 eV. D.c. conductivity and dielec. relaxation time were found to be Arrhenius. Parameters such as energy d. and power d. of lithium-based **electrochem. cells** are indicated. The open-circuit voltage being constant over a longer period of time indicates the durability of the **electrolyte**.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 57, 76

ST lithium ion conducting glass **electrolyte; battery**

lithium ion conducting glass **electrolyte; borovanadate lithium glass electrolyte battery; borate lithium glass electrolyte battery**

IT Borate glasses

RL: DEV (Device component use); PRP (Properties); USES (Uses)
(lithium arsenoborate; properties of lithium ion conducting glass **electrolytes for batteries**)

IT Phosphate glasses

RL: DEV (Device component use); PRP (Properties); USES (Uses)
(lithium arsenophosphate; properties of lithium ion conducting glass **electrolytes for batteries**)

IT Borate glasses

RL: DEV (Device component use); PRP (Properties); USES (Uses)
(lithium borate; properties of lithium ion conducting glass **electrolytes for batteries**)

IT Borate glasses

RL: DEV (Device component use); PRP (Properties); USES (Uses)
(lithium borovanadate; properties of lithium ion conducting glass **electrolytes for batteries**)

IT Phosphate glasses

RL: DEV (Device component use); PRP (Properties); USES (Uses)
(lithium molybdophosphate; properties of lithium ion conducting glass **electrolytes for batteries**)

IT Phosphate glasses

RL: DEV (Device component use); PRP (Properties); USES (Uses)
(lithium phosphovanadate; properties of lithium ion conducting glass **electrolytes for batteries**)

IT Electric conductivity

Electric impedance
(of lithium ion conducting glass **electrolytes for batteries**)

IT **Battery electrolytes**

(properties of lithium ion conducting glass **electrolytes for batteries**)

IT 1303-86-2, Boron oxide, uses 1313-27-5,

Molybdenum trioxide, uses 1314-56-3, Phosphorus pentoxide, uses

1314-62-1, Vanadium pentoxide, uses

1327-53-3, Arsenic trioxide 7447-41-8, Lithium

chloride, uses 12057-24-8, Lithium

oxide, uses

RL: DEV (Device component use); PRP (Properties); USES (Uses)
(glass containing; properties of lithium ion conducting glass
electrolytes for batteries)

IT 1303-86-2, Boron oxide, uses 1314-62-1
, Vanadium pentoxide, uses 7447-41-8,
Lithium chloride, uses 12057-24-8,
Lithium oxide, uses

RL: DEV (Device component use); PRP (Properties); USES (Uses)
(glass containing; properties of lithium ion conducting glass
electrolytes for batteries)

RN 1303-86-2 HCAPLUS

CN Boron oxide (B2O3) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 1314-62-1 HCAPLUS

CN Vanadium oxide (V2O5) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 7447-41-8 HCAPLUS

CN Lithium chloride (LiCl) (CA INDEX NAME)

Cl—Li

RN 12057-24-8 HCAPLUS

CN Lithium oxide (Li2O) (CA INDEX NAME)

Li—O—Li

L80 ANSWER 8 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1996:132462 HCAPLUS Full-text

DN 124:207057

TI Thin films of amorphous electrode materials for Li **microbatteries**

AU Ribes, M.; Guessous, A.; Sarradin, J.

CS LPMS, Universite Montpellier II, Montpellier, 34095, Fr.

SO Proceedings - Electrochemical Society (1996), 95-22 (Thin Film

Solid Ionic Devices and Materials), 164-72

CODEN: PESODO; ISSN: 0161-6374

PB Electrochemical Society

DT Journal

LA English

AB Several vitreous or amorphous thin films were prepared and characterized for use as components for **microbatteries** i.e. **electrolyte** or electrode depending upon their characteristics. In particular, the electrochem. behavior of amorphous Fe2O3 thin films was studied for the 1st time. These films were characterized by a good electrochem. reversibility and an interesting specific capacity (≈ 330 Ah/kg). They were combined with thin films of **V2O5-B2O3** mixed conducting glasses to test the feasibility of a rocking-chair **battery** using a liquid **electrolyte**.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST thin film amorphous electrode lithium **microbattery**;

battery oxide sulfide electrode **electrolyte**

IT Electric conductivity and conduction
(of thin films of amorphous electrode and **electrolyte**
materials for Li **microbatteries**)

IT **Batteries**, secondary
(thin films of amorphous electrode materials for Li
microbatteries)

IT Glass, oxide
RL: DEV (Device component use); USES (Uses)
(vanadoborate, thin films of amorphous electrode materials for Li
microbatteries)

IT 1303-86-2, Boron sesquioxide, uses 1309-37-1, Iron sesquioxide,
uses 1314-62-1, **Vanadium pentoxide**, uses
1314-80-3, Phosphorus pentasulfide 7447-41-8, **Lithium**
chloride, uses 10377-51-2, Lithium iodide 12057-24-8,
Lithium oxide, uses 12136-58-2, Lithium sulfide
13759-10-9, Silicon disulfide
RL: DEV (Device component use); USES (Uses)
(thin films of amorphous electrode materials and **electrolytes**
for Li **microbatteries** containing)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); USES (Uses)
(thin films of amorphous electrode materials for Li
microbatteries)

IT 1303-86-2, Boron sesquioxide, uses 1314-62-1,
Vanadium pentoxide, uses 7447-41-8,
Lithium chloride, uses 12057-24-8,
Lithium oxide, uses
RL: DEV (Device component use); USES (Uses)
(thin films of amorphous electrode materials and **electrolytes**
for Li **microbatteries** containing)

RN 1303-86-2 HCAPLUS
CN Boron oxide (B2O3) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 1314-62-1 HCAPLUS
CN Vanadium oxide (V2O5) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 7447-41-8 HCAPLUS
CN Lithium chloride (LiCl) (CA INDEX NAME)

Cl-Li

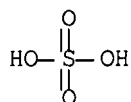
RN 12057-24-8 HCAPLUS
CN Lithium oxide (Li2O) (CA INDEX NAME)

Li-O-Li

L80 ANSWER 9 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN
AN 1989:537484 HCAPLUS Full-text
DN 111:137484
TI New positive-electrode materials for lithium thin film secondary
batteries

- AU Meunier, G.; Dormoy, R.; Levasseur, A.
 CS Lab. Chim. Solide, Ec. Natl. Super. Chim. Phys. Bordeaux, Talence, F-33405, Fr.
 SO Materials Science & Engineering, B: Solid-State Materials for Advanced Technology (1989), B3(1-2), 19-23
 CODEN: MSBTEK; ISSN: 0921-5107
 DT Journal
 LA English
 AB Thin films of Ti oxysulfides (TiS_xO_y) were obtained by rf sputtering on Pt- or ITO-coated glass and used as intercalation cathodes in solid-state **microbatteries** with ternary sputtered oxide glass (**B2O3-Li2O-Li2SO4**) as **electrolyte** and evaporated Li as anode. The oxysulfide films were amorphous and hygroscopic; a homogeneous distribution of Ti, S, and O throughout the film was observed by SIMS profiling. More than 50 cycles were obtained at c.d. of $\leq 62 \mu\text{A}/\text{cm}^2$; the materials were chemical stable and no irreversible reactions occurred between electrode and **electrolyte** materials.
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 57, 72
- ST titanium oxysulfide lithium intercalation cathode; lithium titanium oxisulfide **battery** stability; boron oxide glass **electrolyte battery**; glass **electrolyte battery** lithium sulfate; **electrolyte battery** lithium oxide glass
- IT Sputtering
 (of titanium oxysulfide, for lithium intercalation **microbattery** with oxide glass **electrolyte**)
- IT Cathodes
 (**battery**, titanium oxysulfide, preparation and lithium intercalation by, in **microbattery** with oxide glass **electrolyte**)
- IT Inclusion reaction
 (intercalation, electrochem., of lithium, by titanium oxysulfide, in **microbattery** with oxide glass **electrolyte**)
- IT Glass, oxide
 RL: USES (Uses)
 (lithium borate sulfate, **electrolyte**, lithium-titanium oxysulfide intercalation **microbattery** with, fabrication and performance of)
- IT 122827-51-4P, Titanium oxide sulfide ($\text{TiO}_{0.2}\text{S}_{1.8}$)
 122827-52-5P, Titanium oxide sulfide ($\text{TiO}_{0.97}\text{S}_{1.11}$)
 122827-53-6P, Titanium oxide sulfide ($\text{TiO}_{2.15}\text{S}_{0.18}$) 122827-54-7P, Titanium oxide sulfide ($\text{TiO}_{1.3}\text{S}_{1.5}$) 122827-55-8P, Titanium oxide sulfide ($\text{TiO}_{0.7}\text{S}_{1.5}$) 122827-56-9P, Titanium oxide sulfide ($\text{TiO}_{1.14}\text{S}_{1.42}$)
 RL: PREP (Preparation)
 (cathodes, preparation and lithium intercalation by, in **microbattery** with oxide glass **electrolyte**)
- IT 7440-06-4P, Platinum, uses and miscellaneous 50926-11-9P, ITO
 RL: PREP (Preparation)
 (current collectors, titanium oxysulfide film cathode on, preparation and lithium intercalation by, in **microbattery** with oxide glass **electrolyte**)
- IT 10377-48-7, Lithium sulfate (Li_2SO_4)
 12057-24-8, Lithium oxide (Li_2O),
 uses and miscellaneous
 RL: USES (Uses)
 (glass **electrolyte** containing, lithium-titanium oxysulfide intercalation **microbattery** with, fabrication and performance of)

IT 7439-93-2, Lithium, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (intercalation of, by titanium oxysulfide, in **microbattery**
 with oxide glass **electrolyte**)
 IT 10377-48-7, Lithium sulfate (Li_2SO_4)
 12057-24-8, Lithium oxide (Li_2O),
 uses and miscellaneous
 RL: USES (Uses)
 (glass **electrolyte** containing, lithium-titanium oxysulfide
 intercalation **microbattery** with, fabrication and performance
 of)
 RN 10377-48-7 HCAPLUS
 CN Sulfuric acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

RN 12057-24-8 HCAPLUS
 CN Lithium oxide (Li_2O) (CA INDEX NAME)

Li-O-Li

L80 ANSWER 10 OF 10 HCAPLUS COPYRIGHT 2007 ACS on STN
 AN 1979:141357 HCAPLUS Full-text
 DN 90:141357
 TI Amorphous cation conductive material based on lithium
 IN Reau, Jean Maurice; Levasseur, Alain; Fouassier, Claude; Cales, Bernard;
 Hagenmuller, Paul
 PA Compagnie Generale d'Electricite S. A., Fr.
 SO Ger. Offen., 16 pp.
 CODEN: GWXXBX
 DT **Patent**
 LA German

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 2815437	A1	19781019	DE 1978-2815437	19780410 <--
	FR 2387192	A1	19781110	FR 1977-11376	19770415 <--
	FR 2387192	B1	19820521		
	GB 1595632	A	19810812	GB 1978-13968	19780410 <--
	JP 53128732	A	19781110	JP 1978-43370	19780414 <--
	US 4184015	A	19800115	US 1978-896527	19780417 <--
PRAI	FR 1977-11376	A	19770415	<--	

AB Cationically conductive Li borate glass was prepared and contained a compound with the general formula $(\text{B}_2\text{O}_3 \cdot x\text{M} \cdot y\text{N}) \cdot a\text{Li}_2\text{O} \cdot b\text{Li}_2\text{Q}$, where M is Al_2O_3 , V_2O_5 , P_2O_5 , As_2O_5 , or As_2O_3 , N is SiO_2 or GeO_2 , x is 0-0.35, y is 0-0.8, a is 0-2, b is 0-1.5, and Q is mono-, di-, or trivalent anion, which det. whether z is 1, 2, or 3, and is F-, Cl-, Br-, S²⁻, SO₄²⁻, MoO₄²⁻, WO₄²⁻, N₃⁻, or PO₄³⁻. The

raw materials required are Li₂O, B₂O₃, Li₂O₃, or LiOH. They are mixed, held at 700-1200° for 5 min, quenched, and calcined at 50° below the recrystn. point for 15 h.

IC C03C0003-14
CC 57-1 (Ceramics)
Section cross-reference(s): 76
IT 7447-41-8, uses and miscellaneous 12057-24-8, uses and miscellaneous
RL: USES (Uses)
(glass, cationically conductive)
IT 7447-41-8, uses and miscellaneous 12057-24-8, uses and miscellaneous
RL: USES (Uses)
(glass, cationically conductive)
RN 7447-41-8 HCAPLUS
CN Lithium chloride (LiCl) (CA INDEX NAME)

Cl-Li

RN 12057-24-8 HCAPLUS
CN Lithium oxide (Li₂O) (CA INDEX NAME)

Li-O-Li

=> => fil wpix
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FILE LAST UPDATED: 26 APR 2007 <20070426/UP>
MOST RECENT THOMSON SCIENTIFIC UPDATE: 200727 <200727/DW>
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>>> New display format FRAGHITSTR available <<<
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http://www.stn-international.de/archive/stn_online_news/fraghitstr_ex.pdf

>>> IPC Reform backfile reclassification has been loaded to 31 December 2006. No update date (UP) has been created for the reclassified documents, but they can be identified by 20060101/UPIC and 20061231/UPIC. <<<

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<http://scientific.thomson.com/support/patents/coverage/latestupdates/>

PLEASE BE AWARE OF THE NEW IPC REFORM IN 2006, SEE
http://www.stn-international.de/stndatabases/details/ipc_reform.html and
<http://scientific.thomson.com/media/scpdf/ipcrdpi.pdf>

>>> FOR DETAILS ON THE NEW AND ENHANCED DERWENT WORLD PATENTS INDEX
 PLEASE SEE

http://www.stn-international.de/stndatabases/details/dwpi_r.html <<<
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=> d bib ab tech abex tot

L111 ANSWER 1 OF 5 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 AN 2004-582891 [57] WPIX Full-text
 DNC C2004-212670 [57]
 DNN N2004-460672 [57]
 TI Solid **electrolyte** for lithium or thin film battery comprises
 composition comprising **titanium dioxide**,
vanadium pentaoxide, **tungsten oxide**,
 or **tantalum pentaoxide**, and **lithium**
chloride or **lithium sulfate**
 DC L03; X16
 IN JIN Y; JIN Y G; LEE J; LEE J H; LEE S; LEE S S; PARK Y; PARK Y S; RI S
 PA (SMSU-C) SAMSUNG ELECTRONICS CO LTD
 CYC 34
 PIA EP 1443582 A1 20040804 (200457)* EN 15[3]
 JP 2004235155 A 20040819 (200457) JA 14
 US 20040151986 A1 20040805 (200457) EN
 KR 2004069752 A 20040806 (200480) KO
 KR 513726 B 20050908 (200680) KO
 ADT EP 1443582 A1 EP 2004-250404 20040126; KR 2004069752 A KR 2003-6288
 20030130; US 20040151986 A1 US 2004-757500 20040115; JP 2004235155 A
 JP 2004-24681 20040130; KR 513726 B KR 2003-6288 20030130
 FDT KR 513726 B Previous Publ KR 2004069752 A
 PRAI KR 2003-6288 20030130
 AB EP 1443582 A1 UPAB: 20050531
 NOVELTY - A solid **electrolyte** comprises a composition comprising **titanium**
dioxide, **vanadium pentaoxide**, **tungsten oxide**, or
tantalum pentaoxide; and **lithium**
chloride, or **lithium sulfate**.
 DETAILED DESCRIPTION - The solid **electrolyte** comprises composition of formula
 $a\text{Li}_2\text{O}-b\text{B}_2\text{O}_3-c\text{M}-d\text{X}$. M = **titanium dioxide**, **vanadium pentaoxide**, **tungsten oxide**,
 or
tantalum pentaoxide; and
 X = **lithium chloride**, or **lithium sulfate**.
 0.4 less than a less than 0.55, 0.4 less than b less than 0.55, 0.02 less than
 c less than 0.05, $a+b+c = 1$, and
 0 at most d less than 0.2.
 An INDEPENDENT CLAIM is also included for a method for preparing the solid
electrolyte comprising: mixing **lithium oxide** precursor compound, **boron oxide**,
 and compound consisting of **titanium dioxide**, **vanadium pentaoxide**, **tungsten**
oxide, and **tantalum pentaoxide**, followed by milling; heating the resultant
 powder mixture so that **lithium oxide** precursor compound is thermally
 decomposed into **lithium oxide**; heating the resultant mixture to obtain a
 uniformly molten glass; and quenching the molten glass to obtain a glassy
 solid **electrolyte**.
 USE - Used for lithium battery or thin film battery (claimed).
 ADVANTAGE - The **electrolyte** has improved ionic conductivity and
 electrochemical stability. It provides batteries having improved charge-

discharge rate, power output, and cycle life. DESCRIPTION OF DRAWINGS - The figure is a graph of temperature profile for glassy **electrolyte** preparation.

TECH

INORGANIC CHEMISTRY - Preferred Properties: (a) is 0.45-0.52, (b) is 0.45-0.52, (c) is 0.03-0.04, and (d) is 0.001-0.15.

Preferred Methods: **Lithium chloride** or **lithium**

sulfate is added to the mixture. **Lithium oxide**

is decomposed at 600-800degreesC. The molten glass is obtained at 900-1500degreesC. It is quenched at 0-25degreesC.

L111 ANSWER 2 OF 5 WPIX COPYRIGHT 2007

THE THOMSON CORP on STN

AN 2004-224380 [21] WPIX Full-text

DNC C2004-088540 [21]

DNN N2004-177199 [21]

TI Electrode for use in conjunction with **electrolyte** in electrochemical device, comprises first layer comprising electroactive material, and second layer comprising conductive particles

DC A26; A85; L03; P54; X16

IN CHIANG Y; GOZDZ A S; HOLMAN R K; LOXLEY A; NUNES B; OSTRAAT M; RILEY G N; VIOLA M S; CHIANG Y M; LOXLEY A L

PA (AONE-N) A123 SYSTEMS INC

CYC 100

PIA US 20040018430 A1 20040129 (200421)* EN 28[6]

WO 2004011901 A2 20040205 (200421) EN

AU 2003281736 A1 20040216 (200453) EN

AU 2003281736 A8 20051103 (200629) EN

US 7087348 B2 20060808 (200652) EN

ADT US 20040018430 A1 Provisional US 2002-398697P 20020726; US

20040018430 A1 US 2003-354405 20030130; AU 2003281736 A1 AU

2003-281736 20030722; WO 2004011901 A2 WO 2003-US22954 20030722; AU

2003281736 A8 AU 2003-281736 20030722

FDT AU 2003281736 A1 Based on WO 2004011901 A; AU 2003281736 A8 Based on WO 2004011901 A

PRAI US 2003-354405 20030130

US 2002-398697P 20020726

AB US 20040018430 A1 UPAB: 20050528

NOVELTY - An electrode for use in conjunction with an **electrolyte** or its precursor in an electrochemical device, comprises a first layer comprising an electroactive material, and a second layer comprising conductive particles. The second layer has a refractive index lower than that of the electroactive material and lower than the refractive index of the **electrolyte** or its precursor.

DETAILED DESCRIPTION - An electrode for use in conjunction with an **electrolyte** or its precursor in an electrochemical device, comprises a first layer comprising an electroactive material; and a second layer deposited on the surface of the first layer comprising conductive particles. The second layer has a refractive index lower than a refractive index of the electroactive material and lower than the refractive index of the **electrolyte** or its precursor.

INDEPENDENT CLAIMS are also included for: (a) an electrochemical device, comprising a first electrode in electronic communication with a first current collector; a second electrode in electronic communication with a second current collector; and an **electrolyte** in ionic contact with the first and second electrodes, where the first and/or second electrodes include electrically connected, coated particles comprising an electroactive material and a layer comprising a conductive material, and sufficient low index material such that the refractive index of the layer is less than that of the **electrolyte** or an **electrolyte** precursor, where the layer substantially coats an outer surface of the electroactive material; (b) an electrode material for use in conjunction with an **electrolyte** or its precursor in an electrochemical

device, comprising electrically connected coated particles comprising an electroactive material and a layer comprising a conductive material substantially coating an outer surface of the electroactive material and having an electronic conductivity greater than about 2 S/cm and a Young's modulus less than 100 GPa;

(c) a coated particle, comprising a core of electroactive material; and a layer deposited on an outer surface of the electroactive material, the layer substantially coating an outer surface of the electroactive material and comprising a network of electrically connected conductive material occupying a region between particles of a low refractive index material;

(d) a polymer composition, comprising a homogeneous mixture of a conductive polymer and a low refractive index polymer, where the mixture is a dispersion, a solution-dispersion, or a solution; (e) a dispersion comprising a highly fluorinated polymer and particles of an electrically conductive polymer; (f) a composite coating comprising a low refractive index material and an electrically conductive material; (g) a dispersion comprising a non-coalescing, non-deforming component; a soluble, polymeric film forming component; and a conductive component, that is deformable, in a swollen state or a colloid of dimensions that can be easily be located within the open volume produced by the non coalescing particles;

(h) a method of preparing an electrochemical device comprising combining first particles, second particles, and a polymer **electrolyte** or its precursor, the first and second particles are selected to exert a repelling force on each other when combined with the polymer **electrolyte** or its precursor, where the first and/or second particles comprise an electroactive material and a layer comprising a conductive material and sufficient low index material such that the refractive index of the layer is less than that of the **electrolyte** or an **electrolyte** precursor, where the layer substantially coats an outer surface of the electroactive material; segregating portion(s) of the first particle into a first spatial region that is essentially free of the second particle to form a network of electrically-connected first components to form a first electrode; and segregating portion(s) of the second particle into a second spatial region that is essentially free of the first particle to form a network of electrically connected second particles to form the second electrode, where the polymer **electrolyte** is in ionic communication with both the first and second electrodes;

(i) a method of making an electrode material for use in conjunction with an **electrolyte** or its precursor in an electrochemical device, comprising preparing a dispersion or solution comprising a conductive material and a low refractive index material; depositing the dispersion or solution as a layer onto an outer surface of an electroactive material, where the layer comprises an electrically connected network of conductive material on the electroactive material; (j) a method of making a stable dispersion, comprising selecting a conductive material; selecting a low refractive index material having a refractive index less than the conductive material; selecting a coalescing agent; and mixing the conductive material, the low refractive index material, and the coalescing agent until a homogenous dispersion or solution is obtained;

(k) a method of screening sample materials capable of exerting repelling forces with electrode materials used in the fabrication of create self-organizing battery devices, comprising preparing a particle or coating of the sample material; preparing a particle of a predetermined electrode material; selecting an **electrolyte** or its precursor in physical and chemical contact with the sample material and electrode material; and measuring the interaction force between the particle of sample material and the predetermined electrode material to determine whether the particles repel one another in the presence of the conductive medium, where the interaction force is measured by atomic force microscopy; and

(l) an electrochemical device, comprising a first electrode in electronic communication with a first current collector; a second electrode in electronic

communication with a second current collector; and an **electrolyte** in ionic contact with said first and second electrodes, where the first and/or second electrodes include electrically connected, coated particles comprising an electroactive material and a layer comprising a conductive material substantially coating an outer surface of the electroactive material, where the layer has an electronic conductivity greater than 2 S/cm and is free of elemental carbon.

USE - For use in conjunction with an **electrolyte** or its precursor in an electrochemical device (claimed).

ADVANTAGE - The inventive electrode has conductive materials that provide a combination of enough electronic and ionic conductivity, and electrochemical stability to produce batteries with long cycle life and high power density.

DESCRIPTION OF DRAWINGS - The figure shows a schematic illustration of two adjacent encapsulated electroactive particles.

TECH

ELECTRICAL POWER AND ENERGY - Preferred Composition: The low index material comprises at least 50 wt % of the layer or of the latex dispersion content.

Preferred Component: The layer of particles comprises a continuous network of electrically connected conductive material. The layer further includes a filler material that is dissolvable upon contact with an **electrolyte** solution. The first electrode is a cathode. The second electrode is an anode. The first layer is a thin film. The conductive particles comprise a conductive oxide. The conductive material is electrically connected. The separating medium is a dielectric medium. Preferred Configuration: The electrically conductive material occupies a region between the particles of the low index material.

Preferred Function: The adjacent coated particles of like composition of the layer exert attractive forces such that elastic deformation occurs at a surface contact interface between the adjacent particles.

Preferred Material: The conductive material is ionically conductive, or electrically conductive. The electroactive material of the first and/or second electrode includes a lithium intercalating material.

Preferred Condition: The layer includes a material with a refractive index lower than 2.0, preferably lower than 1.4. It also includes a conductive material having electronic conductivity of at least 10^{-2} , preferably at least 10 S/cm. The second layer has an electronic conductivity greater than 10^{-2} S/cm; an ionic conductivity greater than 10^{-7} S/cm; and a thickness of 0.05-1 μm . The layer includes a conductive material having ionic conductivity of at least 10^{-7} S/cm. The layer includes a conductive material having ionic conductivity of at least 10^{-6} S/cm. The layer has a thickness less than 1, preferably less than 0.05 μm . A Hamaker constant characterizing the interaction between the first and the second electrodes in **electrolyte** or its precursor is negative. The low refractive index material has a refractive index lower than the refractive index of the electroactive material. The lateral dimension of the conductive material in the plane of the coating is less than 0.25 μm . The lateral dimension of the conductive material of the composite is less than 0.1, preferably less than 0.025 μm .

Preferred Method: The dispersion or solution is deposited on the surface of the electroactive material by a physical, chemical or mechanical deposition process. The physical deposition process includes a vapor phase or ablation based process. The chemical deposition process includes in situ polymerization, coacervation, precipitation, or a sol-gel process. The mechanical deposition process includes roll coating, casting, electrospray, thermal spray, ultrasonic spray, powder coating, fluidized bed coating, dispersion coating, magnetically assisted impact coating, or mechanofusion.

POLYMERS - Preferred Material: The low index material or the secondary material comprises fluorinated polymers, preferably

polytetrafluoroethylene, poly(vinylidene fluoride), poly(fluoroalkyl acrylate), poly(fluoroalkyl methacrylate), polypropylene, **vanadium oxide**, fluorinated esters of methacrylic acid, or fluorinated esters of acrylic acids. The electrically conductive material and/or the secondary material comprise elastic materials that are readily deformable by application of mechanical or thermal energy. The conductive material is a conductive polymer comprising polyanilines, polythiophenes, polypyrroles, copolymers, or their derivatives (preferably poly(3,4-ethylene dioxythiophene), poly(2-methoxyaniline), or poly(3-octylthiophene)).

Preferred Component: The second layer includes a polymer blend comprising conductive particles. The conductive polymer further includes a dopant that increases the conductivity of the conducting polymer. The **electrolyte** comprises a solid polymer **electrolyte**, preferably poly(ethylene oxide), poly(styrene), poly(acrylonitrile), poly(vinylidene fluoride), ethylene carbonate, diethyl carbonate, dimethyl carbonate, propylene carbonate, or a block copolymer). The low refractive index material consists of a fluorinated polymer. The dispersion comprises particles of carbon dispersed in a solution of fluorinated polymer.

Preferred Composition: The polymer composition further comprises water, and a coalescing agent.

CERAMICS AND GLASS - Preferred Component: The **electrolyte** comprises a glass comprising lithium iodide, lithium fluoride, lithium chloride, glassy compositions of lithium oxide-boron oxide-bismuth oxide, glassy compositions of **lithium oxide-boron**

oxide-diphosphorus pentoxide, glassy compositions of **lithium oxide-boron oxide**, lead

oxide, a sol or gel of the oxides, and/or hydroxides of titanium, zirconium, lead, molybdenum, tungsten, silicon, germanium, aluminum, boron, phosphorus, or bismuth.

ORGANIC CHEMISTRY - Preferred Component: The coalescing agent comprises N-methyl-2-pyrrolidinone, glycol ether, a glycol ether acetate, or dibutylphthalate.

INORGANIC CHEMISTRY - Preferred Component: The conductive material includes a conductive oxide, comprising **vanadium oxide**, indium tin oxide, lithium cobalt oxide, **titanium oxide**, or their alloys. It also includes a metal, metal carbide, a metal sulfide, and/or carbon. The conductive particles comprise carbon. The conductive component is metallic colloid, or gold particles.

Preferred Material: The electroactive material of the first electrode comprises lithium cobaltite, lithium cobaltite doped with magnesium, lithium nickelite, lithium manganate, lithium manganate doped with aluminum, lithium iron phosphate, lithium manganese phosphate, Li₂Fe₂(SO₄)₃, **vanadium oxide**, V6O11, and/or tin oxide.

The electroactive material of the second electrode comprises carbon, amorphous carbon, graphite, mesocarbon microbeads, lithium, lithium aluminum, Li₉Al₄, Li₃Al, zinc, lithium zinc, silver, lithium silver, Li₁₀Ag₃, boron, Li₅B₄, Li₇B₆, germanium, silicon, Li₁₂Si₇, Li₂₁Si₈, Li₁₃Si₄, Li₂₁Si₅, tin, Li₅Sn₂, Li₁₃Sn₅, Li₇Sn₂, Li₂₂Sn₅, antimony, Li₂Sb, Li₃Sb, bismuth, lithium bismuth, Li₃Bi, tin dioxide, tin oxide, manganese oxide, Mn₂O₃, manganese dioxide, Mn₃O₄, cobalt oxide, nickel oxide, ferrous oxide, LiFe₂O₄, **titanium dioxide**, lithium titanate, and/or glass.

ABEX EXAMPLE - An aqueous dispersion of poly(3,4 ethylene dioxythiophene)-polystyrene sulfonate (PEDT-PSS) (1.3 wt.%) was mixed with an aqueous dispersion of polytetrafluoroethylene (PTFE). The PEDT-PSS and PTFE particles had been cleansed of residual surfactant by exhaustive dialysis against pure water. A minimum amount of non-ionic, perfluorinated surfactant was added to aid final dispersion stability. The resulting

PEDT-PSS/PTFE mixture was prepared such that the ratio of solids of PEDT-PSS/PTFE was 1:9. The volume of $\text{Li}_x\text{Mn}_y\text{Co}_2$ (LMCO) powder to be added to this mixture was calculated such that the volume of LMCO:(PEDT-PSS/PTFE) was 95:5. A volume of water equal to the calculated volume of LMCO was added to the mixture to dilute it, and LMCO was added under high shear mixing to produce a well-dispersed mixture. This mixture was calculated to possess solids loading of 50 vol.% and a mass ratio of LMCO:(PEDT-PSS/PTFE) of 95:4.5:0.5. This mixture was spray dried to form LMCO particles encapsulated with the conductive polymer system comprising PEDT-PSS and PTFE.

L111 ANSWER 3 OF 5 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 AN 2004-156916 [15] WPIX Full-text
 DNC C2004-062473 [15]
 DNN N2004-125561 [15]
 TI Bipolar article, e.g. battery for battery-powered device, comprises bipolar structure having interpenetrating anode and cathode
 DC A85; L03; P42; T01; V01; W01; X16
 IN CHIANG Y M; FULOP R; GOZDZ A S; RILEY G N; VIOLA M S
 PA (AONE-N) A123 SYSTEMS INC
 CYC 100
 PIA WO 2004012286 A1 20040205 (200415)* EN 62[12]
 AU 2003259271 A1 20040216 (200453) EN
 US 20050026037 A1 20050203 (200511) EN
 ADT WO 2004012286 A1 WO 2003-US23581 20030728; US 20050026037 A1 Provisional
 US 2002-398902P 20020726; US 20050026037 A1 Provisional US
 2002-399050P 20020726; AU 2003259271 A1 AU 2003-259271 20030728; US
 20050026037 A1 US 2003-628681 20030728
 FDT AU 2003259271 A1 Based on WO 2004012286 A
 PRAI US 2002-399050P 20020726
 US 2002-398902P 20020726
 US 2003-628681 20030728
 AB WO 2004012286 A1 UPAB: 20050906
 NOVELTY - A bipolar article having an arbitrary form factor comprises bipolar structure having:
 (a) interpenetrating anode (104) and cathode (102); (b) **electrolyte** (106) in contact with and separating the anode and cathode;
 (c) a cathode current collector that is in electronic communication with the cathode; and
 (d) an anode current collector that is in electronic communication with the anode.
 The bipolar article has a desired arbitrary configuration.
 DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for: (a) a battery powered device comprising an interpenetrating electrode battery; housing; and a mechanism powered by the battery that is integrated in the housing; and
 (b) a method of making a bipolar article having an arbitrary form factor comprising providing a first current collector in a mold having a configuration corresponding to the desired arbitrary form factor; depositing on the first current collector a first electrode material, an **electrolyte** material and a second electrode material, where the electrode material is configured to have features projecting into the **electrolyte** material and the other electrode material; and providing a second current collector on the first electrode, **electrolyte** and second electrode materials.
 USE - The bipolar article, e.g. battery, is used for battery powered device e.g. cellular telephone, laptop computer, personal digital assistant or toy (claimed).
 ADVANTAGE - The bipolar article provides efficient use of space in the device.
 DESCRIPTION OF DRAWINGS - The figure is an illustration of the cell having interpenetrating electrodes. Cell (100)
 Cathode (102)

Anode (104)
Electrolyte (106)
 Electrode extension (108)

TECH

ELECTRICAL POWER AND ENERGY - Preferred Component: The anode and cathode are self-assembling networks of particles disposed in the **electrolyte**. The cathode current collector is attractive to the cathode network and repulsive to the anode network. The anode current collector is attractive to the anode network and repulsive to the cathode network. The anode and cathode current collectors comprise coating providing a repulsive force between the current collector and the opposite anode or cathode network. The anode and cathode current collector include projecting features. The projecting features are prongs or mesh.

Preferred Property: The bipolar article has a power density of more than 300 W/kg. A multilayered lithium ion battery has an energy density of more than 212 Wh/kg.

Preferred Dimension: The minimum distance between adjacent current collectors is at least 500, preferably 1,000 microns. The mesh layer defines openings, each having a width of more than 200 microns.

POLYMERS - Preferred Component: The coating includes a conductive oxide, polythiophene, polyaniline, poly(o-methoxyaniline) (POMA), poly(3-octylthiophene) (POTh), poly(3,4-ethylene dioxythiophene) (PEDT), poly(3,4 ethylene dioxythiophene)-polystyrene sulfonate (PEDT-PSS), poly(vinylidene fluoride) (PVDF), poly(ethylene oxide) (PEO), PTFE and/or their derivatives. The **electrolyte** can be PEO, poly(styrene), poly(acrylonitrile), PVDF, diiodomethane (DIM), 1,3-diiodopropane, N,N-dimethylformamide, dimethylpropylene urea, ethylene carbonate, diethylene carbonate, dimethyl carbonate, propylene carbonate or block copolymer lithium **electrolytes**.

ELECTRONICS - Preferred Device: The device has a cavity. The arbitrary configuration of the bipolar article is space-filling within the cavity.

INORGANIC CHEMISTRY - Preferred Material: The anode is made from carbon, amorphous carbon, graphite, mesocarbon microbeads, lithium (Li), Li-aluminum, Li₉Al₄ (sic), Li₃Al (sic), zinc (Zn), Li-Zn, silver (Ag), Li-Ag, Li₁₀Ag₃ (sic), boron, lithium boride, Li₇Be₆ (sic), germanium, silicon, Li₁₂Si₇ (sic), Li₂₁Si₈ (sic), Li₁₃Si₄ (sic), Li₂₁Si₅ (sic), tin (Sn), Li₅Sn₂, Li₁₃Sn₅, Li₇Sn₂, Li₂₂Sn₅, antimony, lithium antimonide, Li₃Sb (sic), bismuth (Bi), Li-Bi, Li₃Bi, tin dioxide, tin oxide, manganese oxide, manganese (II) oxide, manganese dioxide, manganese (III) oxide, cobalt oxide, nickel oxide, iron oxide, LiFe₂O₄, **titanium dioxide**, LiTi₂O₄ (sic) or glass. The cathode is made from lithium cobalt oxide (LiCoO₂), LiCoO₂ doped with magnesium, lithium nickel dioxide, lithium manganese dioxide, lithium manganese dioxide (LiMnO₂), LiMnO₂ doped with aluminum, doped and undoped lithium iron phosphate, lithium manganese phosphate, Li_xV₆O₁₃ (sic), Li₂Fe₂(SO₄)₃ (sic), ~~vanadium oxide~~, V₆O₁₁ (sic) or tin oxide. The **electrolyte** can be lithium iodide, lithium fluoride, lithium chloride, lithium (II) oxide (**Li₂O**)-~~boron oxide (B₂O₃)~~- bismuth oxide compounds, **Li₂O-B₂O₃**-phosphorus oxide compounds, **Li₂O-B₂O₃**-lead oxide compounds or sols and gels of oxides and hydroxides of titanium, zirconium, lead, and Bi.

L111 ANSWER 4 OF 5 WPIX COPYRIGHT 2007

THE THOMSON CORP on STN

AN 2003-342396 [32] WPIX Full-text

CR 2002-490234; 2004-179375; 2006-037226

DNC C2003-121938 [44]

DNN N2003-364052 [44]

TI Self-organizing electrodes for electrochemical devices such as secondary batteries comprises forming interlocked networks electrodes from two sets

of mutually repelling self attractive materials that are connected to collectors

DC A85; L03; P81; V01; X12; X16

IN CHIANG Y; CHIANG Y M; GOZDZ A S; HOLMAN R K; LOXLEY A; MOOREHEAD W D; RILEY G N; VIOLA M S

PA (AONE-N) A123 SYSTEMS INC; (AONE-N) A123SYSTEMS INC; (MASI-C) MASSACHUSETTS INST TECHNOLOGY; (AONE-N) A123 SYSTEMS

CYC 99

PIA WO 2003012908 A2 20030213 (200332)* EN 136[30]

US 20030099884 A1 20030529 (200337) EN

EP 1433217 A2 20040630 (200443) EN

AU 2002330924 A1 20030217 (200452) EN

KR 2004047780 A 20040605 (200465) KO

JP 2005525674 W 20050825 (200560) JA 85

IN 2004000118 P2 20060407 (200636) EN

AU 2002330924 A8 20051027 (200638) EN

CN 1864298 A 20061115 (200720) ZH

ADT WO 2003012908 A2 WO 2002-US23880 20020726; US 20030099884 A1 Provisional US 2001-308360P 20010727; US 20030099884 A1 CIP of US 2001-21740 20011022; AU 2002330924 A1 AU 2002-330924 20020726; AU 2002330924 A8 AU 2002-330924 20020726; EP 1433217 A2 EP 2002-768358 20020726; US 20030099884 A1 US 2002-206662 20020726; EP 1433217 A2 WO 2002-US23880 20020726; JP 2005525674 W WO 2002-US23880 20020726; IN 2004000118 P2 WO 2002-US23880 20020726; JP 2005525674 W JP 2003-517975 20020726; KR 2004047780 A KR 2004-701229 20040127; IN 2004000118 P2 IN 2004-KN118 20040130; CN 1864298 A CN 2002-818181 20020726

FDT EP 1433217 A2 Based on WO 2003012908 A; AU 2002330924 A1 Based on WO 2003012908 A; JP 2005525674 W Based on WO 2003012908 A; AU 2002330924 A8 Based on WO 2003012908 A

PRAI US 2001-21740 20011022
US 2001-308360P 20010727
US 2002-206662 20020726

AB WO 2003012908 A2 UPAB: 20060119

NOVELTY - An electrochemical device comprises an interpenetrating network formed by two electrodes in electrical communication with their respective current collectors, one or both of the electrodes having a structure providing at least two pathways to the current collector. An ionically conductive medium is ionic contact with the electrodes.

DETAILED DESCRIPTION - The electrodes are composed of a branching structure where the crosssectional area of the electrodes increases as the electrodes approach their current collectors. One or both of the, preferably interlocked, electrodes are preferably formed from sintered particles forming a sintered body or one or more of the electrodes comprises an open-celled foam or sponge. The particles of the two electrodes preferably exert a repelling force on the particles of the opposing electrode each other when combined with the ionic medium, and are self attractive in the ionically conductive medium or **electrolyte** which has an ionic conductive of less than 10^{-4} S/cm.

Preferred electrochemical device: The electrochemical device has a power density of greater than 300 W/kg and an energy density of greater than 450 Wh/l for cells having a cell thickness less than 0.1 mm, where the cell thickness includes the collectors. An INDEPENDENT CLAIM is included for a method comprising forming a bipolar article by introducing a first component composed of sub-components that are self attractive and introducing a second component composed of sub-components that are self-attractive and that exert a repelling force on the first component in a medium. The particles of the first component self-organize into a first network and the components of the second component are allowed to self-aggregate into a second network. The first and second components are preferably allowed to self-aggregate onto an interpenetrating network.

INDEPENDENT CLAIMS are also included for: (1) a capacitor composed of two poles separated by an electrically insulating material to give a Hamaker constant that is negative; (2) an electrochromic device composed of first and second poles, at least one of which is composed of a material that changes color or optical transmission when oxidized or reduced, the poles being separated by an insulating material

USE - For energy storage devices, e.g. secondary batteries, capacitors and electrochromic devices

ADVANTAGE - The electrode interface area with the ionically conductive medium is maximized and the distance or path that ions and/or electrodes must reliably traverse during operation of the device is minimized.

DESCRIPTION OF DRAWINGS - The drawing shows a schematic illustration of a self-organizing bipolar device.

TECH

INORGANIC CHEMISTRY - Preferred electronically-connected particles: The electronically-connected particles are composed of LiCoO₂ and LiCoO₂ doped with Mg, LiNiO₂ LiMnO₂, optionally doped with Al, LiFePO₄, optionally doped with Mg, Al, Ti, Nb, Ta or W, Li₂Fe₂(SO₄)₃, V₂O₅, V₆O₁₁, C, amorphous carbon, graphite, mesocarbon microbeads, L. LiAl, Li₉Al₄, Li₃Al, Zn, LiZn, Ag, LiAg, Li₁₀Ag₃, B, Li₅B₄, Li₇B₆, Ge, Si, Li₁₂Si₇, Li₁₂Si₈, Li₁₃Si₄, Li₂₁Si₅, Sn, Li₅Sn₂, Li₁₃Sn₅, Li₇Sn₂, Li₂₂Sn₅, Sb, Li₂Sb, LiSb, Bi, LiBi, Li₃Bi, SnO₂, SnO, MnO, Mn₂O₃, MnO₂, Mn₃O₄, CoO, NiO, FeO, LiFe₂O₄, TiO₂, LiTi₂O₄, glass with a Sn-B-P-O compound and mesocarbon microbeads coated with at least one of poly(o-methoxyaniline, poly-3-octylthiophene) and poly(vinylidene fluoride).
ORGANIC CHEMISTRY - Preferred ionically conductive medium: The ionically conductive medium is one or more of poly(ethylene oxide), poly(propylene oxide), poly(styrene), poly(imide), poly(acrylonitrile), poly(vinylidene fluoride) methoxyethoxy phosphazine, diiodomethane, 1, 3-diiodopropane, N, N-dimethylformamide, dimethylpropylene urea, ethylene carbonate, diethylene carbonate, propylene carbonate, a block copolymer lithium **electrolyte**, doped with a lithium salt, glass with at least one of LiI, LiF, LiCl, Li₂O-B₂O₃-Bi₂O₃, Li₂O-B₂O₃-P₂O₅ and Li₂O-B₂O₃-PbO and a sol or gel of the oxides or hydroxides of Si, B, P, Ti, Zr, Pb or Bi.

L111 ANSWER 5 OF 5 WPIX COPYRIGHT 2007

THE THOMSON CORP on STN

AN 2000-674236 [66] WPIX Full-text

CR 2001-026561

DNC C2000-204503 [66]

DNN N2000-499852 [66]

TI Electrochemical cell comprises an alkali metal electrode, a cathode, a catholyte, and a separator comprising E-glass material between the anode and the cathode

DC L01; L03; X16

IN DAVID; SPILLMAN D M; TAKEUCHI E S

PA (GREW-C) GREATBATCH LTD WILSON

CYC 27

PIA EP 1050913 A1 20001108 (200066)* EN 9[0] <--

JP 2001118584 A 20010427 (200130) JA 25 <--

US 6410181 B1 20020625 (200246) EN <--

EP 1050913 B1 20070124 (200710) EN

DE 60033083 E 20070315 (200726) DE

ADT EP 1050913 A1 EP 2000-303777 20000505; US 6410181 B1 Provisional

US 1999-132549P 19990505; US 6410181 B1 US 2000-562532

20000502; JP 2001118584 A JP 2000-176121 20000508; DE

60033083 E DE 2000-633083 20000505; DE 60033083 E EP

2000-303777 20000505

FDT DE 60033083 E Based on EP 1050913 A

PRAI US 2000-562532 20000502

US 1999-132549P 19990505

AB EP 1050913 A1 UPAB: 20050412

NOVELTY - An electrochemical cell comprises: an alkali metal electrode; a cathode; a catholyte; and a separator comprising E-glass material between the anode and the cathode.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method of providing an electrochemical cell which comprises: (a) providing an alkali metal anode; (b) providing a cathode current collector; (c) activating the anode and the cathode current collector with a catholyte; (d) positioning a separator of E-glass material between the anode and the cathode.

USE - None given.

ADVANTAGE - The electrochemical cell exhibits increased energy density and improved restart capability in comparison to conventional cells.

TECH

ORGANIC CHEMISTRY - Preferred Materials: The catholyte comprises an organic solvent which is selected from tetrahydrofuran, propylene carbonate, acetonitrile, dimethyl sulfoxide, dimethyl formamide, diacetyl acetamide and mixtures of these. The cathode comprises a carbonaceous material.

ELECTRICAL POWER AND ENERGY - Preferred Cell: A casing houses the anode and cathode. The casing serves as a first terminal for one of the electrodes and a lead serves as a terminal for the other electrode.

INORGANIC CHEMISTRY - Preferred Materials: The catholyte comprises an inorganic depolarizer solvent selected from thionyl chloride, sulfuryl chloride, selenium oxychloride, chromyl chloride, phosphoryl chloride and phosphorus sulfur trichloride.

A halogen or an interhalogen is dissolved in the catholyte. The halogen is selected from iodine, bromine, chlorine, fluorine and mixtures of these.

The interhalogen is selected from chlorine fluoride (ClF), chlorine trifluoride (ClF₃), iodine chloride (ICI), iodine trichloride (ICl₃), iodine bromine (IBr), iodine trifluoride (IF₃), iodine pentafluoride (IF₅), bromine chloride (BrCl), bromine fluoride (BrF), bromine trifluoride (BrF₃), bromine pentafluoride (BrF₅) and mixtures of these. The catholyte comprises lithium aluminum chloride (LiAlCl₄) dissolved in thionyl chloride.

The catholyte includes a salt selected from LiCl, LiBr, LiPF₆, LiBF₄, LiAsF₆, LiSbF₆, LiClO₄, LiAlCl₄, LiGaCl₄, LiC(SO₂CF₃)₃, LiN(SO₂CF₃)₂, LiSCN, LiO₃SCF₂CF₃, LiC₆H₅SO₃, LiO₂, LiO₂CCF₃, LiSO₃F, LiB(C₆H₅)₄, LiCF₃SO₃ and mixtures of these.

CERAMICS AND GLASS - Preferred Materials: The E-glass material comprises (wt.%): 52 - 56 silica (SiO₂), 12 - 16 alumina (Al₂O₃), not more than 6 magnesium oxide (MgO), 16 - 25 calcium oxide (CaO), not more than 2 sodium oxide + potassium oxide (Na₂O + K₂O), 5 - 10 **boron oxide** (B₂O₃), not more than 1.5 **titanium dioxide** (TiO₂), not more than 1 fluorine (F₂) and 0.8 iron oxide (FeO).

METALLURGY - Preferred Materials: The lead is 52 alloy preferably plated with nickel.

=> d his

(FILE 'HOME' ENTERED AT 08:40:20 ON 01 MAY 2007)
SET COST OFF

FILE 'HCAPLUS' ENTERED AT 08:40:36 ON 01 MAY 2007

L1 1 S US20040151986/PN OR (US2004-757500# OR KR2003-6288)/AP,PRN
E PARK/AU
L2 19 S E3
E PARK Y/AU

L3 615 S E3,E23
 E PARK YOUNG/AU
 L4 39 S E3
 E PARK YOUNG S/AU
 L5 45 S E3,E29
 E PARK YOUNGS/AU
 L6 2 S E7
 E PARK NAME/AU
 L7 118 S E4
 E LEE/AU
 L8 35 S E3
 E LEE J/AU
 L9 3531 S E3,E43-E45
 E LEE JONG/AU
 L10 39 S E3
 E LEE JONG H/AU
 L11 164 S E3,E14-E16
 E LEE JONGH/AU
 E LEE NAME/AU
 L12 276 S E4
 E JIN/AU
 L13 1 S E3
 E JIN Y/AU
 L14 492 S E3,E8
 E JIN YOUNG/AU
 L15 27 S E3,E10
 E JIN YOUNGG/AU
 E JIN NAME/AU
 L16 7 S E4
 E LEE S/AU
 L17 1346 S E3
 E LEE S S/AU
 L18 335 S E3-E7
 E LEE SEOK/AU
 L19 95 S E3
 L20 11 S E69
 E LEE SEOKS/AU
 E YOUNG/AU
 L21 2 S E3
 E YOUNG S/AU
 L22 176 S E3
 L23 15 S E22
 E YOUNG SIN/AU
 E YOUNGSIN/AU
 E YOUNG NAME/AU
 L24 3 S E4
 E JONG/AU
 E JONG H/AU
 E JONG NAME/AU
 E JONGH/AU
 E YOUNG G/AU
 L25 78 S E3
 L26 41 S E18,E19
 E YOUNG GU/AU
 E YOUNGGU/AU

FILE 'REGISTRY' ENTERED AT 08:47:39 ON 01 MAY 2007

L27 4 S 13463-67-7 OR 1314-62-1 OR 1314-35-8 OR 1314-61-0
 L28 2 S 7447-41-8 OR 10377-48-7
 L29 9 S 7664-93-9/CRN AND LI/ELS AND 2/NC

L30 6 S L29 NOT (6LI OR 7LI)
 L31 7 S L28,L30
 L32 1 S 12057-24-8
 L33 1 S 1303-86-2
 L34 1063 S (13463-67-7 OR 1314-62-1 OR 1314-35-8 OR 1314-61-0)/CRN
 L35 1 S L34 AND 12057-24-8/CRN
 L36 2 S L34 AND 1303-86-2/CRN
 L37 0 S L34 AND (175170-04-4 OR 165817-30-1 OR 28686-04-6 OR 15147-42

FILE 'HCAPLUS' ENTERED AT 08:51:36 ON 01 MAY 2007

L38 207030 S L27
 L39 211593 S TIO2 OR V2O5 OR WO3 OR TA2O5
 L40 198985 S TITANIA OR TITANIUM() (OXIDE OR DIOXIDE OR DI OXIDE)
 L41 37363 S (VANADIUM OR DIVANADIUM)() (OXIDE OR PENTOXIDE OR PENTAOXIDE)
 L42 24917 S TUNGSTEN() (OXIDE OR TRIOXIDE OR TRI OXIDE)
 L43 23754 S (TANTALUM OR DITANTALUM)() (OXIDE OR PENTOXIDE OR PENTAOXIDE)
 L44 1074 S TANTALA OR TUNGSTIC OXIDE
 L45 349605 S L38-L44
 L46 759 S L45 AND L31
 L47 39333 S LICL OR (LI OR LITHIUM)()CHLORIDE
 L48 4792 S LI2SO4 OR LI2 SO4 OR (LI OR LITHIUM OR DILITHIUM)() (SULFATE O
 L49 906 S L45 AND L47,L48
 L50 993 S L46,L49
 L51 50 S L50 AND L33
 L52 48353 S B2O3 OR BORON OXIDE
 L53 56 S L50 AND L52
 L54 69 S L51,L53
 L55 30 S L54 AND L32
 L56 30847 S LI2O OR (LI OR LITHIUM OR DILITHIUM OR LI2)()OXIDE
 L57 33 S L54 AND L56
 L58 37 S L55,L57
 L59 15 S L58 AND PY<=2003 NOT P/DT
 L60 18 S L58 AND (PD<=20030130 OR PRD<=20030130 OR AD<=20030130) AND P
 L61 33 S L59,L60
 L62 1 S L1-L26 AND L61
 L63 1 S L1-L26 AND L58
 L64 1 S L62,L63
 L65 1 S L61 AND SAMSUN?/PA,CS
 L66 1 S L64,L65
 L67 9 S L61 AND ?ELECTROLYT?
 E ELECTROLYTE/CT
 L68 3 S E3
 L69 43926 S E18-E33
 E E18+ALL
 L70 95169 S E4+NT
 L71 752628 S E25+OLD,NT,PFT,RT OR E26+OLD,NT,PFT,RT OR E27+OLD,NT,PFT,RT O
 E E9+ALL
 L72 4414 S E6
 L73 4414 S E6+OLDNT
 E E4+ALL
 E E11+ALL
 L74 5090 S E11+OLD
 L75 10 S L61 AND L68-L74
 L76 13 S L66,L67,L75
 L77 7 S L61 AND H01M/IPC,IC,ICM,ICS
 L78 14 S L76,L77
 L79 9 S L78 AND (?BATTER? OR FUEL CELL OR ELECTR? CELL)
 L80 10 S L77,L79
 L81 4 S L78 NOT L80
 L82 19 S L61 NOT L78

FILE 'HCAPLUS' ENTERED AT 09:04:31 ON 01 MAY 2007

FILE 'WPIX' ENTERED AT 09:04:53 ON 01 MAY 2007

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L83      98835 S L39 OR L40 OR L41 OR L42 OR L43 OR L44
          E TITANIA/CN
L84      1 S E3
          E VANADIUM OXIDE/CN
L85      1 S E5
          E TUNGSTEN OXIDE/CN
L86      1 S E11
          E TANTALUM OXIDE/CN
L87      1 S E7
L88      4 S L84-L87
          SEL SDCN
          EDIT /SDCN /DCN
L89      26609 S E1-E4
L90      40661 S (1522 OR 1966)/DRN
L91      112626 S L83,L89,L90
L92      5504 S L47 OR L48
          E LITHIUM CHLORIDE/CN
L93      1 S E3
          E LITHIUM SULFATE/CN
L94      1 S E3
L95      2 S L93,L94
          SEL SDCN
          EDIT /SDCN /DCN
L96      1133 S E1-E2
L97      2510 S (1679 OR 1914)/DRN
L98      246 S L91 AND L92,L96,L97
L99      17228 S L52
          E BORON OXIDE/CN
L100     1 S E3
L101     4188 S R01498/DCN OR 1498/DRN
L102     14 S L98 AND L99,L101
L103     7228 S L56
          E LITHIUM OXIDE/CN
L104     1 S E3
L105     1423 S R01941/DCN OR 1941/DRN
L106     6 S L102 AND L103,L105
L107     6 S L106 AND (PD<=20030130 OR PRD<=20030130 OR AD<=20030130)
L108     5 S L107 AND H01M/IPC,IC,ICM,ICS
L109     4 S L107 AND ?ELECTROLYT?
L110     1 S L107 NOT L108,L109
L111     5 S L108,L109

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FILE 'WPIX' ENTERED AT 09:11:23 ON 01 MAY 2007

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